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EDITORIALS

An Employment Bureau

IN A radio speech on May 13th, Dr. Julius Klein, Assistant Secretary of Commerce, made the following statement:

> Here is an idea, for what it may be worth. Why cannot the different industries, through their trade associations, set up effective, vigorous agencies or bureaus to place men and women executives and higher ranking experts in a given line who find themselves unemployed? Such cooperative undertakings could accomplish tremendous benefits, not only to the position-seeker but to the industry, by conserving for it the specialized experience of years which otherwise might be lost to another far less fruitful field. Much excellent work was done by agencies of this sort maintained for a considerable period by the Associated Grocery Manufacturers of America and by the Engineering Societies' Employment Service. But by all means let us have more of this sort of thing among our hundreds of professional and trade associations.

Work of this sort ought to be one of the chief functions of The American Institute of Chemists. The establishment of a national employment bureau for chemists, financed on such a basis that its representatives could make personal contacts all over the country, would be a great help to chemists and to the chemical industry.

Mobility in employment is of just as much value during times of prosperity as in times of depression. Theoretically, the able man ought to be able to find opportunities in which he can use his abilities to their fullest advantage, and companies ought to be able to find the best possible men for their openings. Actually, this is far from the case.

The entire system of depending for positions on "contacts" and on knowing somebody who has heard that there might be a job with such and such a company is wasteful of the time and nervous energy of the chemist, and fails completely to maintain that fluidity by which ability will find its proper niche. When men have to depend on "getting a break" in order to receive deserved advancement, society is not using its full productive power.

Certainly the individual chemist has not the opportunity to learn about openings in industrial concerns all over the country, nor has the individual manufacturer the money to spend on keeping in touch with promising young chemists—and even if he did, it would be wasteful of

wealth. A single bureau could handle the problem much more efficiently and cheaply; and the establishment of such a bureau is one of the obvious opportunities of a strong professional organization.

Chemical Mobility

ONE of the results of the lack of a powerful employment bureau is the unfortunate attitude which sometimes arises in the intra-plant relationships among chemists. Some chemists worry about their jobs to the point of refusing to permit subordinates to develop. Small and petty as such an attitude is, in an imperfectly fluid professional market the chemist has what looks like an excuse for falling into this unsound personal policy. A man who can keep his activities so much his exclusive knowledge that he is absolutely needed to carry out a particular process cannot very easily be replaced. But it is also true that he cannot be promoted to a higher position.

The cheapening of an industrial process by reducing it to a routine which can be handled by lower-priced labor is one of the functions of the chemist, and one of the things for which he is paid. The man who carries out this economically advantageous step is the type of man who is earning his salary and whom the company should be glad to put into a position of greater responsibility. If his company cannot find a higher position for him, there ought to be other companies who do have openings for a man with these qualities. There are such companies; but the average chemist is sometimes held back by the thought that he will be unable to get into touch with them.

In any case, it is certainly small recommendation for a man that he possesses secrets which the company needs. In the end they will find out how to get along without him, and he will be left with no excuse at all for holding a position and with no inducements to offer to other companies.

In many cases, it does seem as if injustice occurs. We know of an educator who developed a boys' school until it was a going concern. The board of managers then told him that they no longer needed his organizing ability and that the school could be run by a cheaper man. They gave him a check for $5000 and thanked him for his services.

This particular man felt that he had been subjected to a grave injustice; but as a matter of fact, had he? Certainly the ability to organize any project requires a higher type of ability than routine administra-

tion. If this man remained in routine work, he would not and could not receive the salary which his full services were worth.

Everyone ought to be in a position where he can use his capacities to the full; and there seems small reason to suppose that the world is so over-supplied with high-grade men that opportunities in normal times will not be available. Only, the machinery for bringing these opportunities to the attention of good men ought to be made more efficient.

Noteworthy Performance

IT SEEMS in order to mention somewhere a matter about which there have been many comments—and that is the fine performance of the speakers at the medal presentation. One dull or badly delivered speech is enough to spoil an entire evening. All of the speakers at the medal award are to be congratulated not only on what they said but on the interesting, vital way in which they said it.

Perhaps one of the reasons was the sincerity of their feeling about the appropriateness of the award. This pleasure at the honoring of Dr. Herty seems to be unusually common not only among chemists but among those who have known him in other fields; and these expressions may well mean more to the medalist than being singled out as a distinguished member of the profession.

It is to be hoped that in general the award of the Institute medal carries an implication of personal qualities as well as of actual technical or even professional achievements—though, as a matter of fact, professional achievement generally is found among those who have enough love for their neighbors to make friends. It will usually be found that movements for the benefit of a race or group are instituted by altruistic people. Such movements seldom become powerful enough in their infancy to return dividends in personal profit to those who inaugurate them.

Dr. Herty is certainly one who by inherent nature thinks of his fellow men and fellow chemists. In expressing their appreciation of his personal qualities as well as of the things he has done, the speakers said what a great many other people have felt but have not had the opportunity to express publicly. The American Institute of Chemists can only thank them for saying it so well.

THE MEDAL AWARD

Joseph E. Ransdell Marston T. Bogert Frederick E. Breithut Henry W. Jessup
Henry G. Knight Francis P. Garvan Charles H. Herty Howard S. Neiman

The Institute Medal

By Frederick E. Breithut

BEFORE doing anything else I want to announce that we have with us this evening Mrs. Edgar F. Smith; and I have asked her to take the middle seat to act as an inspiration for all of us.

Some one asked why the incoming president, Dr. Knight, should present the outgoing president, or, as the program has it, the *retiring* president. I want to tell you several reasons for that. In the first place, most of the speakers at this table have at one time or another been my boss, and this is the first opportunity I have had to get back at them. Another reason is this: Some of the speakers have come up to me and whispered into my ear, "You know, I have something to say that is a joke on so and so at the other end of the table, and if you let him speak first I could get it in a little better."

Now a single word about the medal. The medal of The American Institute of Chemists was given the first two times to two distinguished chemists for strictly chemical work. The first award was to Dr. William Blum, who is here with us tonight. The second award was to Dr. Lafayette B. Mendel of Yale University. Both of these awards were very well deserved, but of late the Institute has adopted a new principle, *i. e.*, not to award the medal for strictly chemical work but for noteworthy and outstanding service of a more general nature to the profession and science of chemistry in America.

Three years ago we had the privilege of presenting the medal to Mr. and Mrs. Francis P. Garvan; and I believe that award met with universal approval. I stated before that nearly all the speakers here had been my boss at one time; but if it had not been for The Chemical Foundation and the work of Mr. and Mrs. Garvan most of us chemists would not have any bosses, because there would not be any positions for us. Last year, we presented the medal to Mr. A. W. Mellon and his brother, Richard B. Mellon, for their work in the establishing of the Mellon Institute. Mr. Andrew Mellon has since been promoted, you know, from Secretary of the Treasury to Ambassador to England. I don't say the medal was the cause of it, but. . . !

Medal of
The American Institute of Chemists

"For noteworthy and outstanding service to the science of chemistry or the profession of chemist in America."

Awarded for 1932
to
CHARLES H. HERTY

Past Medalists

1926 William Blum
1927 Lafayette B. Mendel
1929 Mr. and Mrs. Francis Patrick Garvan
1930 George Eastman
1931 Andrew W. and Richard B. Mellon

A Many-sided Chemist*

By Marston T. Bogert

A distinguished fellow-chemist reviews briefly the career of the medalist. Charles H. Herty as a chemist and as a national force.

A GOOD many of us know about more than one side of Dr. Herty. Some of us know from bitter experience what he can do with a billiard cue, and some of us have played with him in baseball games. So enthusiastic is he about baseball that many believe him to be the original of the story about the small boy who hated to admit that he had been born in a sissy place like the Women's Hospital, and therefore told people he had been born in the Yankee Stadium.

But other speakers, including Dr. Finley, whom I see here tonight, will talk about Dr. Herty's personal aspects. I should like to discuss some of the general features of his career.

Dr. Herty began his chemical career as an educator. At the University of Georgia and at the University of North Carolina he was known as an inspiring teacher, a clear expositor, and a winning personality.

At this time his researches were chiefly in pure chemistry, dealing with the double halides (the subject of his doctor's dissertation), the determination of the constitution of inorganic compounds by physico-chemical methods, and rapid methods for oil determinations, particularly in cotton-seed products.

Dr. Herty's first attack on a purely economic problem was inspired by his knowledge of the criminal waste in the great naval stores industry of his own Southland. There was the usual reckless squandering of natural resources which were believed inexhaustible but which in fact

* A speech delivered at the presentation of the medal of The American Institute of Chemists, The Chemists' Club, New York, N. Y., May 7, 1932.

were rapidly melting away. All this was changed by the introduction of the Herty cup-and-gutter system of turpentining, the result of joint labors of our medalist and the United States Bureau of Forestry.

Dr. Herty served as president of the American Chemical Society during 1915–16, and as editor of its *Journal of Industrial and Engineering Chemistry* during 1917–21, when he wrote many editorials on American chemical independence. He was for many years chairman of the society's committee on an institute for chemico-medical research. In 1923 he was chairman of a sub-committee of the latter, which, through the generous financial assistance of The Chemical Foundation, prepared and published a valuable report entitled "The Future Independence and Progress of American Medicine in the Age of Chemistry." This did much to educate the public and to pave the way for the Ransdell Bill and the establishment of a National Institute of Health.

AT THE close of the war Dr. Herty was sent by President Wilson to Paris to negotiate with the reparations authorities for the purchase of impounded stocks of German dyes and other chemicals. The purchase and importation of these supplies he arranged through the Textile Alliance, and thus protected our American consumers, financially and from interruption of their work through lack of essential materials. In the discussions at Washington in the efforts to secure adequate tariff protection, so that we might develop our own dyestuff industry and its collateral manufactures, he was most helpful; and this fine assistance he continued to render as president of the Synthetic Organic Chemical Manufacturers Association and as adviser to The Chemical Foundation.

Reference has already been made to Dr. Herty's activities as chairman of the American Chemical Society committee created for the organization of a national health institute. When the question came up of obtaining governmental action, Dr. Herty labored unceasingly to secure favorable legislation and finally enlisted the powerful aid of Senator Ransdell. Under the skillful leadership of this gifted and far-sighted statesman, the dream has now come true in the enactment of the Ransdell Bill; and our National Institute of Health has been established. Many and outstanding as have been Dr. Herty's contributions, to me this seems by far the most important, for it concerns the health, happiness, and life of all of us, not only of the present generation but of succeeding generations as well.

Recently Dr. Herty has been at work on another problem connected with the development of his native South. Heretofore the slash pine, the fastest growing and most prolific of our pines, was not considered

available for paper manufacture. The resin content was said to be too high. Dr. Herty, however, remembered a conversation with Professor Adolph Tschirch of the University of Bern, a recognized authority on the chemistry of the resins, who expressed the opinion that the origin of resins was pathological rather than physiological; *i. e.*, that they were not present in the tree in any considerable amount, but were produced as a protection for the decorticated surface.

Dr. Herty was convinced that the percentage of resin normally present is not so large as to prevent the manufacture from slash pine of an entirely satisfactory newsprint; and he felt that, with proper conservation and reforestation, this pine could supply all the newsprint needed by the country. This important industrial experiment is now being carried out on an adequate manufacturing scale, thanks to a generous grant of $50,000 from The Chemical Foundation and an appropriation of $20,000 per annum for five years from the state of Georgia. A plant for this purpose is now under construction at Savannah, Georgia, with Dr. Herty in charge, and is rapidly nearing completion. The results of this experiment will be followed with the greatest interest by all of those concerned with chemistry and with the industrial progress and prosperity of our country.

THE scientist is often accused of shirking his duty as a citizen, but this charge could scarcely be lodged against our medalist, who has always discharged patriotically and with conspicuous efficiency all such responsibilities. Ever an outspoken advocate of a closer cooperation between science and industry for their mutual benefit and progress, he has unfailingly acted as one who holds his expert knowledge in trust for the community and as a debt to his profession. The name of his beloved Southland is deeply graven on his heart, and he has been ever a valiant and courageous crusader in her cause. For years he pleaded, argued, and explained how chemistry could contribute to the development and advancement of the country; and, in the face of discouragement, apathy, and indifference, he must have felt often like "a voice crying in the wilderness." But he has lived to see the fruition of these labors; and the applause of his fellow chemists, added to the consciousness of having been of real service to the land he loves so well, must make him very happy tonight.

Companion and Scientist*

By Henry W. Jessup

A chemist in his relaxed moments. The social side of the medalist, as told by a fellow clubman.

I SEE by the program which describes all the other guests that I am a nondescript. I was glad to see Dr. Bogert use a manuscript to guide and to limit his remarks; and I was reminded of the county judge in the northern tier who was asked to deliver an oration at the actual interment of Ward Hunt, a justice of the Supreme Court of the United States, who had had a public funeral in Washington but whose home town thought that there should be obsequies at the grave.

The speaker prepared himself with great care and under a serious sense of responsibility. He had his reminder notes in his inner coat pocket; and he took up the life of Ward Hunt first in his aspects as a citizen, for, when he had reviewed them, he said they "warranted in comparing him to—" (peeking into his pocket) "—comparing him to George Washington." Then he reviewed a few of the justice's opinions in the Supreme Court Reports and, stressing their acumen and learning and reasonableness, he said he was "warranted in comparing him to—" (peeking into his pocket) "—in comparing him to John Marshall." Finally he looked at the noted jurist from the viewpoint of his human relations and, referring to his widow and children who survived him, he said, "We mourn with them, nevertheless we have to bow before the will of—" (peeking for a third time into his pocket) "the will of—Almighty God." So I have fortified myself with certain memoranda.

Your president had written me: "We know all about the chemical aspects of Charles Herty; we want to know something about his social aspects."

Well, of course, my first thought was: How can I do justice to Herty? My next was: Maybe he wouldn't like justice but would prefer equity. So I rang him up and said: "Charlie, I'm invited to do justice to your social aspects; what about it?"

He seemed to hesitate, then said: "All right, I'll stand the gaff!"

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* A speech delivered at the presentation of the medal of The American Institute of Chemists, The Chemists' Club, New York, N. Y., May 7, 1932.

I suppose his chemical aspects call for the scientist's power to analyze with test-tube and retort, whereas his social aspects are discerned by a comfortable and happy intuition. A companion, like a satisfying picture, is something you like to be with; you can sit with a companion in perfect silence and be happy. But no scientist can sit with another scientist in perfect silence; and if they discuss anything, they can't be happy.

The great German dramatist and critic, Lessing, wrote: "The most agreeable of all companions is a simple, frank man, without any high pretensions to an oppressive greatness; one who loves life, and understands the use of it; obliging alike at all hours; above all, of a golden temper and steadfast as an anchor." Such an one I have found in Charles Herty. Devoted to scientific study and research, he has learned Hopkinson Smith's great rule of life, to rinse his mind at decent intervals by genial social intercourse. Smith asserted a man should work eight hours, play eight hours, and sleep eight hours.

Well, Herty cuts the play time down to an average of two hours and, come to think of it, I never saw him sleep. See Prov. XVII, 22: "A merry heart doeth good like a medicine." As a child he had this merry heart. Witness his contribution to a local paper at the age of fourteen—that is, I assume it was his contribution. It read:

"I eat my peas with honey,
I'll do so all my life;
It makes them taste darn funny—
But it holds them on the knife."

This is a scientific age, and the research men are getting too far ahead of us. An Anglican bishop has suggested a moratorium of ten years on new discoveries, to give us time to catch up. But it is also the age of haste. We're all of us always hurrying; that's why we need to carry accident insurance. But we can't afford any moratorium on the pragmatic research man.

To develop the reforestation of his loved state with quick-growing pine, and to prove its availability as raw material for a great and profitable industry in Georgia, is a crown to Herty's helpful achievements. But no layman can do justice to this topic.

As I said, your president wanted something about Herty's "social aspects" and I am fortunate in having found certain verses which did not lose in cold type the warmth of affection that seems to have prompted their composition. They prove that his social aspects are as broad as the Cosmos, as deep as the Chemists' and as high as the Century Clubs.

The Institute's gold medal, to give it permanent durability, is made up with some alloy. So has the pure gold of affection in these lines been tempered with a wee bit of frivolity, for which I make no apology.

I looked up Charlie Herty in America's *Who's Who*,
I found his birth and parentage and data quite a few—
A Ph.B., a Ph.D., Φ B K too,
A Ch.D., a Sc.D., and honors—all his due;
But in his social aspects, which this gathering wants to know
There's very little dope, I find—so I propose to show
That Charlie is a reg'lar guy, a most congenial fellow,
Tho' sad, I thinks, he never drinks and so is never mellow.

Born where the soil is mostly mud—and reddish mud at that,
His hair was doubtless reddish too—he once had quite a mat.
His eyebrows were aggressive, tho' his eyes are blue and mild
And the records seem to show he was a most engaging child.
His dad, whose name was Bernard, said with jovial common sense:
"I never raised my hand to Charles, except in self-defense."

Give him a cue and billiard balls, or a fishing rod and reel,
Or let him start with oysters on an *à la carte* meal;
You'll see his human nature from beneath his titles surge
And all his chemical aspects in his social aspects merge.

I care not for societies, American or French
I hate those chemists' symbols that stand for many a stench,
I sing of Charlie Herty, the jolly baseball fan,
"The noblest work of God," sings Pope, "is just an honest man."

The Public Welfare*

By John H. Finley

Alterations in chemistry, with some of the specific changes wrought by Dr. Herty. The testimony of a noted editor.

WHEN as president of City College I was associated with Dr. Breithut, I read a book entitled *The New Chemistry*. I did this because I was trying to seem to know as much as my professors knew. It was one of Robert Kennedy Duncan's books, and it revised all my chemical knowledge until I wondered whether I knew anything about chemistry at all. I remember that Dr. Duncan said our ancestors must have come from the sea, because in our bodies we have potassium, magnesium, calcium, etc., in the same proportions as those in which they were found in the waters of the pre-Cambrian ocean. How fortunate we are that coming from that far age we find you here—Charles Herty! I, being Presbyterian, can believe that it was all predestined.

I have brought with me tonight a book on chemistry written by my professor of chemistry fifty years ago. He was the first man I had ever seen who had written a book, and I thought every word infallible. He had at one time been a student of Agassiz, and he taught in the college not only chemistry but geology, mineralogy, zoology, physiology, and botany. He was also the acting professor of Latin. Here is his book. In it he says that an atom is the smallest indivisible particle of matter. Now, as you know better than I, the whole structure of chemistry is built upon the divisibility of the atom. I once said to Einstein (I mention Einstein to let you know that I have associated with such great men)

* A speech delivered at the presentation of the medal of The American Institute of Chemists, The Chemists' Club, New York, N. Y., May 7, 1932.

that I was in a fair way of losing everything in science I had acquired in college and was not able to understand what had been told me of the new science. I do hope to keep the Pythagorean proposition that the square of the hypotenuse of a right triangle is equal to the sum of the squares on the other two sides. If that is taken away, I shall have nothing left.

I have brought this little, much-worn book on chemistry here not to ridicule my old professor but to suggest the great changes that have been made in science in the past fifty years. He attended the opening of the Kent Chemical Laboratories in Chicago; and on his return I asked him to tell the faculty about the exercises. This stern old Roman said with tears in his eyes that he had found out that he knew nothing about chemistry. All the discoveries and revisions had passed him by, buried as he was in that little town without current publications. Under his tuition I had to memorize only 65 elements. Now there are 92. But I must not go on in this extemporizing way. When I have to make a speech, I seldom have three weeks, as my friend Mr. Jessup has, in which to prepare an extemporaneous one.

WE HAVE a place in every well-ordered newspaper office which is known as the "morgue," to which we go to get information hurriedly, especially when we write obituaries. If one had suddenly to write Dr. Herty's obituary, he would find an ample collection of clippings relating to his later years. The first is dated September, 1917: "Dr. Herty says the next field of chemistry will be in aviation." Far down in the heap I found a very good one, written at the time this award was announced to Charles Herty. It appeared as an editorial and, if I do say it, I could not have done better myself. It repeats some of the things my friends have already said, but I shall venture to read it nevertheless:

"The late Elwood Hendrick (peace to his soul) in defining the chemists of the future could have found in the present an excellent model in the person and achievements of Dr. Charles H. Herty. The author of the *Percolator Papers*, insisting that degrees in science should be awarded only to those familiar with the relations of science to human affairs, would have found him pre-eminently qualified. His life as a chemist has been devoted to relating his every scientific act to the general welfare, whether in his early days when he saved a self-destroying industry, or in his later years when he has been helping his science to do more for human health. He has been not a colloidal recluse but a crystalloidal personality, driving and permeating.

"He is even better defined in that same delightful work of Dr.

Hendrick's in terms of a human catalyst—one who brings insoluble spirits into solubility and yet is himself unchanged—who in the midst of gloom 'instigates reactions of joy.' He brought as a young man great benefit to his home state of Georgia by researches which revolutionized the turpentine industry. Professor Mims in his *Advancing South* estimated several years ago that Dr. Herty's contribution had already added more than $10,000,000 of annual value to that industry. Recently he has turned his attention again to Southern forests in studying the possibilities of making paper pulp from the slash pine, a new laboratory having been built for that purpose in his native state.

"He has shown himself the farmer's friend in demonstrating that the farm is itself to become a laboratory in which the direct products of the soil are converted to uses never dreamed of in the long past of agriculture. When the chemist's work is done there will be no longer question about the utilization of surplus farm products. But the wider public will have chief reason to thank and remember Dr. Herty for his efforts in finding support for chemical research in every field. He has himself had an influential part in securing the establishment of the National Institute of Health. It is particularly pleasing that one who, like Iapis, chose 'to ply the silent art of healing unpraised' should have such recognition from his own profession."

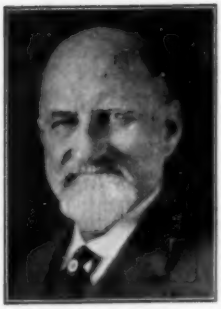
When I was a boy there was only one tree in our prairie farm aside from those that we planted, and that was a large cottonwood tree which grew in the midst of the field that I used to plow. I have thought that for my final resting place I should like to go back and lie down under that tree and then in the spring climb up with the sap and look out over the great stretch of prairie.

When Charles Herty goes he will find a turpentine tree to lie down under. And turpentine trees will make a little grove around his grave. I am sure that the turpentine trees would like him as their king, if kings were only popular, or perhaps as their president. This devotion will continue as long as there is a turpentine tree on the earth. His epitaph will be:

Charles H. Herty, Ph.D.
Dearest friend of the turpentine tree.

The Fight for a National Institute of Health

By Joseph E. Ransdell



The successful struggle to make human health research as much a government function as plant and animal research. The work of The Chemical Foundation.

IT GIVES me genuine pleasure to say a few words in honor of Dr. Herty on this auspicious occasion. He has richly earned the medal bestowed on him by The American Institute of Chemists for "noteworthy and outstanding service to the science and profession of chemistry in America," and I have no doubt that the future has in store for him many similar honors.

I have been asked to discuss briefly Dr. Herty's activities in relation to public health and the National Institute of Health. His first effort in behalf of health, with which I am familiar, was his article in the *Journal of Industrial and Engineering Chemistry* (of which he was editor), September, 1918, entitled "War Chemistry in the Alleviation of Suffering." In it he suggested the foundation of an institute, somewhat analogous to the Mellon Institute, where laboratory tests of all kinds could be made through the medium of fellowships established by private funds and through cooperation with our university laboratories and the hospitals of the country. This editorial attracted wide and favorable attention. It became the keynote and basis of that remarkable monograph entitled "The Future Independence and Progress of American Medicine in the Age of Chemistry," prepared by a committee of eminent pharmacologists

* A speech delivered at the presentation of the medal of The American Institute of Chemists, The Chemists' Club, New York, N. Y., May 7, 1932.

and chemists, of which he was chairman. Its concluding sentence, pregnant with prophecy and hope, reads:

> "May the day come when the lesson of the power of cooperative endeavor, so effectively utilized in the Chemical Warfare Service organization, may be applied with equal success to the solution of the problems of disease and health."

I first met Dr. Herty in 1926 when preparing for introduction in the United States Senate on July 1st of that year, a bill to create the National Institute of Health and apply in it the cooperative endeavor for health referred to in Dr. Herty's monograph. For twenty years I had been greatly interested in health problems, my first effort in that line being a bill to eradicate Texas cattle fever, enacted into law in 1906, and the next my bill to create a National Home for Lepers, passed in 1917.

A MUTUAL friend, Paul Wooton, well-known Washington journalist, brought Dr. Herty and myself together, and from that day until the passage of the act four years later, May 26, 1930, we saw a great deal of each other. The doctor expressed the greatest interest in my bill, made a number of valuable suggestions, and gave me a copy of the admirable report just mentioned.

At that time Dr. Herty was adviser to The Chemical Foundation, which, under the leadership and inspiration of its able, patriotic president, Mr. Francis P. Garvan, was closely studying everything connected with the great science of chemistry, including its relation to public health.

The doctor and Mr. Garvan put their heads together and decided to throw all the influence of The Chemical Foundation behind my bill. Their decision and resultant action proved a God-send to the measure and gave the greatest encouragement to me.

There was much ignorance and indifference in Congress with regard to Federal efforts in behalf of human beings, with two notable exceptions: Senator Copeland of New York and Senator Hatfield of West Virginia. Much educational work had to be done. Liberal sums had been appropriated to fight diseases of plants and lower animals. Senators and representatives had been deluged with appeals from constituents urging their support of appropriations to destroy the cotton boll weevil, corn borer, and other enemies of plants; hog cholera, Texas fever, and other pests of animals. These involved direct, heavy pecuniary losses to many citizens, losses which were apparent at a glance and which claimed prompt attention. But the old saying, "Everybody's

business is nobody's," applied to all measures in aid of human health. The folks back home knew nothing about such bills, hence were silent in regard to them; and congressmen, in the multiplicity of their many arduous duties, were slow to act.

DR. HERTY'S services were invaluable during the four years the bill was under consideration. He aided materially in securing endorsements for it from prominent individuals and scientific institutes, from societies and associations. He was the leading witness before the Senate Commerce Committee in its elaborate hearings on the measure; made many addresses about it before the schools, colleges, and public assemblies in various states; and brought to bear in its support all the force of his bright mind and magnetic personality upon a number of senators and representatives, especially the late Speaker Longworth.

I do not think it too much to say that the bill creating the National Institute of Health might have failed of passage had it not been for the wonderful cooperation of Dr. Herty and other officers of The Chemical Foundation, all of whom did the finest kind of team-work in its support.

The world is a better place because of the noble work in which Charles Herty and Frank Garvan played such an effective part, and it was a great privilege to labor with them. I invoke the blessings of Heaven upon you, Dr. Herty, in your present work, the success of which means so much to America and the land of Dixie where you and I were born. May God be with you in all your efforts; and may happiness—our being's aim and end—be your reward here and hereafter.

Speech of Presentation*

By Francis P. Garvan

The president of The Chemical Foundation points out the importance of Dr. Herty's work during the War. The declaration of American chemical independence.

I HAVE been told that there are two reasons why I was asked to present the medal of The American Institute of Chemists to Dr. Herty—because it was appropriate for one Irishman to present a medal to another, and because I wouldn't make a speech. They didn't know it is impossible for an Irishman to present a medal without making a speech.

I have become a crank on the subject of personal responsibility, especially in public life—or in journalism or in any other walk of life. I want to tell just two examples from my own experience to point out what I mean. They are timely, especially when purity in public life in New York City is so greatly a thing to be desired. Mitchell Palmer once talked to President Wilson about a public matter in which he was interested. Wilson's election was due more to Palmer than to any other one man; and so, during the interview, Wilson said, "Your presentation of this matter sounds all right; but, Mitchell, I am under more obligations to you than to any one else. You are one reason why I am President. That is why your physical presence, my friendship for you, all affect me so much that I am not able to separate this influence from the request. I want you to put your proposition in writing. When I read it, I can judge it for itself, and I will be free from any possibility of being influenced by your presence."

* A speech delivered at the presentation of the medal of The American Institute of Chemists, The Chemists' Club, New York, N. Y., May 7, 1932.

This matter of personal integrity was again brought to my attention by my father, one time when we were in Venice. My father was a poor Irish boy who came to New York and walked barefoot from New York to Hartford. He told me that he had done but one crooked thing in all his public life. At that time it was one of his duties to buy up property for parks, often buying it before the new park was definitely named. One lot consisted almost exclusively of the property of a Mr. and Mrs. Pond, both of whom had died. When the time came to choose a name, the Park Board remembered that Mrs. Pond's name was Elizabeth, and they decided to name the park Elizabeth. Father told me afterward, "I didn't do right. All the time I was going through the ceremony of naming that park, I wasn't thinking of Mrs. Pond. I was thinking of your sister Elizabeth, who died two months ago."

DURING the war we learned to look at individuals. They had tremendous and wide-sweeping influence in the world. Think of the influence of Cardinal Mercier, of Jeanne d'Arc. Think of Trotzky, whom I saw on the Bowery leaning against a post, a man who held great personal influence over his people. Think of the Kaiser, in his own country almost a god, who was as great a paranoiac as Harry K. Thaw. Think of the great personal influence of all these human beings. But when the true story of the war period is written, we shall find that one of the great influences through all that time was Charles H. Herty.

Editor of scientific papers, teacher in a small college, he responded to the call to teach a lesson of vital importance to the American people. This country was in a troubled position because of the development of chemistry in other countries. The United States was the victim of the propaganda of other nations as far as her chemical output was concerned. This propaganda was so potent that we actually felt that our coal did not contain the elements needed to produce the drugs and dyes needed.

I am not a chemist. I had a so-called classical education; and I had scarcely heard of chemistry when I became Alien Property Custodian I did not know of the responsibility that faced an Alien Property Custodian. But I found that we were dependent on Europe for such drugs as salvarsan and novocaine; on Chile for nitrates; on France for potash; on the East for rubber; on Chile for iodine; and so on down the list. Each of these countries held over us the power of extortion. For example, ten million syphilitics were cut off from drugs during the war.

Today the last claim of any country is gone. We produce most of our own drugs. Rubber has been conquered. I do not mean that

we can manufacture it as cheaply as it can be produced elsewhere at its present low price, but the power of extortion can no longer be used against us. England under the Stevenson Act charged us $600,000,000 more for rubber than she ought to have charged.

DR. HERTY richly deserves all the speeches which spoke of him in words of praise; but I believe that the greatest testimony to Dr. Herty will be a comparison of the condition of the country in 1916–1917 with the condition of the country when gratitude is sufficiently infused into the people to know what he has accomplished.

With an emotion which is dictated by the sincerest friendship and by gratitude for the work he has done for America, on behalf of The American Institute of Chemists it is my privilege to present Dr. Herty with this medal.

Toastmaster's Comment

By Frederick E. Breithut

I WANT to take just a moment or two to bring out a point which we, as colleagues of Dr. Herty, wish to emphasize. We want this medal to go to him as our friend. We want him to know that it is presented to him with our sincere admiration, real appreciation, and genuine affection. I cannot imagine any man knowing Dr. Herty for ever so brief an interval without having a real affection for him. In fact, it is difficult not to grow emotional when you talk about Dr. Herty. His sincerity, palpable honesty, and devotion to the science and to the profession of chemistry, to his country, and to the principles in which he believes—these are the qualities of his which we most esteem.

To me personally he stands as an older brother. I have never had a serious problem that I haven't felt the one man from whom to seek advice and counsel was Dr. Herty—and he has never failed me. I know that is true with many other men who are younger than he in the chemical profession.

Speech of Acceptance*

By Charles H. Herty

Some of the problems that chemical research in America has had to face and some of its specific accomplishments. An appreciation of the men who worked together to make America chemically free.

THERE is something very unreal about these proceedings tonight. All my life I have been used to razzing and being razzed, and as I listened to these speakers I felt that I would wake up tomorrow morning to find I had got the greatest ragging of all time. I will say that they let me off on one thing. They referred to Milledgeville as being my birthplace, but none explained that in Milledgeville is the Georgia State Lunatic Asylum.

This occasion, it seems to me, is unique in a particular way. So far as I know, this is the first time a medal has been given to one who has been simply a cheer-leader, endeavoring to stimulate others to play this game called Chemistry to the best of their ability, under favorable conditions.

When I first took hold of this cheer-leading work, it was greatly needed. Those who recall the days of 1915 and 1916 will agree that at that time American chemists were not so highly thought of; the bleachers were full of knockers among our own people. But what a transformation has taken place in the last fifteen years!

Yesterday I looked over two addresses I had given while president of the American Chemical Society, for I wanted to see what were the main points I had talked about. First of all was the plea for the development of a dyestuff industry. This was stressed by men like Poucher and Gar-

* A speech delivered at the presentation of the medal of The American Institute of Chemists, The Chemists' Club, New York, N. Y., May 7, 1932.

van and a few others in Washington year after year. They know what we went through then, when our efforts had so little public support. Stirred to action by foreign threats of wide unemployment and suffering, and guarded with the necessary legislation, our young American chemists, as soon as they overcame their feeling of inferiority and put their brains to work, achieved great successes in this field.

In 1915 this country's need for nitrates was very great, and when we entered the war the need became imperative. Today the situation is completely changed, and a huge plant in Virginia for the production of synthetic nitrates gives notice of our independence. I want to pay tribute here to a man, not a chemist, who had the vision and the judgment to see what adequate nitrogen supplies meant for agriculture, for industry, and for national defense. Orlando Weber, by his steadfast refusal to go into any international nitrate combine, did more than all the efforts of Congress, with their illusions about the potentialities of Muscle Shoals, to make this country independent of the whole world in the nitrate market.

They told us in those trying days that potash was one of the major deficiencies in our natural resources. Within the last two weeks an announcement of the U. S. Geological Survey, reporting the results of a five-year research program in conjunction with the U. S. Bureau of Mines, confirms the discovery of quantities of available potash in Texas and New Mexico sufficient to supply the entire needs of this country.

During the early days of the war a great shortage of toluene seriously threatened our military efficiency. Today an unlimited supply of toluene from modern coke ovens is the basis of a great organic chemical industry.

In that address at Seattle in 1915 (I almost laughed as I read it the other day) I scored the lack of interest in chemistry in America, and accused our universities of failure to provide up-to-date laboratories and broad training for their chemistry students. But I have recently stated that it would be a good thing if the building of new university laboratories would cease, so that professors would have greater freedom for their research work.

What a struggle we went through in the development and perpetuation of the Chemical Warfare Service! Here again I want to pay tribute to an individual, for every successful effort bears witness to the courageous stand of someone with unquenchable faith in the cause he represents. The one man who stood out for the Chemical Warfare Service when there was a great dearth of understanding of the place of chemistry in national defense was the then Senator from New York State, Hon.

James W. Wadsworth, Jr. I hope American chemists will always remember with gratitude that there was never a time when any question of chemistry came up that "Jimmy" Wadsworth did not answer with every fiber of his being.

Then came Mr. Garvan with his plans to educate the whole American people as to the meaning of chemistry to their everyday lives. One day up at his camp at Raquette Lake was born the idea of the widespread distribution of Slosson's classic *Creative Chemistry*. Through the coming years untold effects upon our national life will result from the understanding of chemistry implanted in young minds by the nation-wide prize essay contests carried on in our schools through the generosity of Mr. and Mrs. Garvan. When I told a group of French chemists about Mr. Garvan's work, they could not believe such a man could exist. I think the flowering of so benevolent a character is one of the finest things about our country.

ANOTHER great advancement has been the change in the attitude of the Congress of the United States. There were sinister influences working in Washington, in the very halls of the United States Senate, against American chemistry. Some of us know the details of that story, things we saw and heard that have never been put into the record. But tonight I want to name four men in Congress who, I can personally testify, contributed largely to this country's welfare through their interest in chemistry.

First of these men was Nicholas Longworth. He saw what chemistry meant to the American people, during the early efforts to obtain protective legislation, in 1916. Throughout my work in behalf of the chemical industry, and later for the National Institute of Health, he was the one man who never failed to give every possible assistance. Let me give just one example of his dynamic interest. I had had the feeling that President Coolidge ought to be more interested in chemistry, and one day I went over to the House of Representatives and sent in my card saying that I should like to speak with Mr. Longworth. He left the Speaker's chair and talked with me for an hour about what I thought Mr. Coolidge should know about chemistry.

"Go back to New York and write me what you have just told me," he said, "and I will hand it to the President. I think I can promise you he will read it."

Another man I want to name is the late Senator Philander Knox of Pennsylvania. When the emergency tariff act was under consideration in 1920, every industry in the country was trying to get in on that

act. But if you will turn to the *Congressional Record* you will see how earnestly Senator Knox plead the cause of chemistry, because of its intimate relationship to the national defense, and how finally Congress saw the need of protection for this particular industry.

Congressman Joe Fordney of Michigan, now deceased, chairman of the important Ways and Means Committee during the long tariff fight, paid me one of the finest compliments I ever had. One night in Midland, through a strange twist of circumstances, I, a Georgia "cracker," was called upon to introduce him to a Michigan audience. He said, "Herty advised me for fifteen years and never led me astray."

Henry T. Rainey of Illinois is still in Congress. How he fought for platinum during the war! His heart is with the chemical industry. When our cause was thoroughly understood, we won fine friends down there in Washington.

Today our American Congress knows what chemical research means, what fundamental research means. I want to stress that point. Dr. Knight, here, has heard me say it before. Congress is away ahead of the rest of the country in this respect. In our discussions about the Ransdell Bill we continually emphasized the importance of fundamental research on problems of health, and everyone in Congress was quick to catch the point. Our government laboratories, supported by taxation, are the logical centers for fundamental research.

EVIDENCES of the results of fundamental research in the chemical industry are so abundant as to be commonplace. That great new chemical center at Charleston, W. Va., is the direct result of fundamental studies in organic and physical chemistry. One day in his office in Wilmington, Mr. Irenee du Pont showed me a small sample of a new material, lead tetraethyl, and told me it was expected that product would eventually return to his company more than all the money they had spent on dyestuff research. Its manufacture created, in turn, a need for greater supplies of bromine, and research found a process for its extraction from seawater, so that a plant is now in operation on the Atlantic seaboard.

Uses have been found for the excess corn crop of the West; and our chemical leaders are confident that chemical conversion of other agricultural products is going to be an important factor in the solution of the farmers' problems. The frozen food industry is just getting into its stride, and one immediate result is an increased market for a new refrigerant, so that within the last year its price has dropped from six to about two cents a pound. Nitrocellulose lacquers have revolutionized

the whole varnish industry, and synthetic resins bid fair to steal the cream of our Southern pine rosin market. The electrochemical industries got an early start up at Niagara Falls, and when we went into the war were a tremendous bulwark to our munitions factories. At New Orleans, in 1915, I urged the harnessing of our water-power, especially in the South. At Anniston, Alabama, a great chemical corporation has grown up, and one of its major products is phosphoric acid, derived from the cheap and abundant phosphate rock of Tennessee and Florida.

THE whole nation was aroused in April, 1925, by the appearance at New York of some forty pounds of synthetic methanol, made in Germany. Editorials berating our American chemists were published widely, and the book *What Price Progress?* published by The Chemical Foundation, directed to stimulating our industrialists and bankers to a greater appreciation of the potentialities of research as a money-maker, followed a survey of conditions by a prominent financial editor, Hugh Farrell. In 1930, according to the census of the U. S. Tariff Commission, 50,000,000 pounds of synthetic methanol were produced in the United States.

There is an earlier chapter to this story. Few know the pitiful truth, that for five years preceding that first importation in 1925 full details of the process, worked out by a brilliant professor in one of our universities, had lain in the files of one of our chemical concerns, because they could not see their way clear to spend the few thousands of dollars necessary to bring the process up to commercial production.

The textile industry has been sound asleep for many years. Recently definite stimuli have awakened its leaders, and two organizations, the Textile Foundation, Inc., and the U. S. Institute for Textile Research (Mr. Garvan was inaugurated as its president this week), have established plans for research programs.

In the last few years the metal industries have awakened to the fact that metallurgy is a branch of chemistry, and that fundamental studies are important. The cooperative research program of the iron and steel industry recognizes this fact, and I am glad to say that my own boy is doing his part in this work. Aluminum girders offer great possibilities in the building industry—for the earth's surface contains twice as much aluminum as iron. Research hasn't yet scratched the surface of this field.

Fundamental research is finding its way into medical circles too. The Mayo Foundation has led the way; and now Dr. Hans T. Clarke, at that wonderful new institution, the Medical Center, a part of Columbia

University, is applying his knowledge of organic chemistry to problems of disease. More and more hospitals are organizing their facilities to give mankind the benefits of research in their clinics. I am glad that Senator Ransdell is giving his time to the furtherance of the project embodied in his bill creating the National Institute of Health, namely, public support of fundamental research at this great federal laboratory, which we hold every hope will prove the well-spring of discoveries of abounding value to the health and welfare of all our people. I shall always look upon my work for this cause as the greatest endeavor of my life.

AND now, at last the cheer-leader is to be allowed to play in the game. He is on the team now. Down in Savannah the wheels are beginning to turn in the plant where we are going to carry out our ideas on the utilization of the young southern pine trees for the production of chemical and mechanical pulps, newsprint, and other white papers. In the Southeastern States we have ideal conditions for the growing of wood cellulose. Sunshine and moisture are abundant, and all-year operation of pulp and paper mills is possible. Over 100,000,000 idle acres can be put into production to supply the pulpwood needs of this nation, a large portion of which is now imported. Preliminary experiments indicate that we are on the right track; and now we are stepping up to the semi-commercial stage to "make the mistakes" and obtain the exhaustive data necessary before we can recommend large capital investments.

It took nerve to try to raise funds for such a demonstration under present conditions; but we succeeded, thanks again to The Chemical Foundation, and to the manufacturers who responded to our appeals with equipment practically at cost, sometimes even as donations. They, too, recognized the value of research. The State of Georgia is sponsoring the project, and funds were appropriated for personnel and maintenance under the direction of the State Commission on Forestry and Geological Development. Savannah has supplied the building, power, steam, wood, etc., for a period of five years, and, thanks to my good friends in the chemical industry, we have not had to buy a pound of chemicals. It's great to work with such a team!

I accept this medal, therefore, as a token of your esteem, and of your faith in me, which gives courage to go on with this great work which I believe will add another chapter in the efforts for the economic independence of our country, and contribute so much to the welfare of the Southern people I love.

THE ANNUAL MEETING

THE tenth annual meeting of The American Institute of Chemists was held at The Chemists' Club, New York, N. Y., on May 7, 1932, at three P. M. President Frederick E. Breithut presided.

The minutes of the previous meeting were approved as recorded.

The teller's report was presented to the effect that the following had received the largest number of votes for the various offices:

President: Henry G. Knight
Vice-President: M. L. Crossley
Secretary: H. S. Neiman
Treasurer: D. P. Morgan, Jr.
Councilors: D. D. Jackson
A. P. Sachs
Frederick Kenney

President Breithut thereupon announced the election of the above officers and councilors; and he resigned the chair to the newly elected president, Henry G. Knight.

The Secretary's report was read, and was accepted.

The Treasurer submitted his report, showing a balance of $1899.20. Mr. A. P. Sachs reported that the auditors had found the Treasurer's report correct. The Treasurer's report was accepted and filed.

The reports of the following committees were then presented: Legislation, Frederick Kenney; Ethics, Henry G. Knight; Professional Education, M. L. Crossley; THE CHEMIST, Edward L. Gordy.

The changes in the code of ethics, as proposed by the Committee on Ethics, were adopted; and the other reports were received and filed.

Chapter reports were presented as follows: New York, Leon V. Quigley; Philadelphia, Eugene F. Cayo; Washington, D. F. J. Lynch.

The report of the Committee on Constitutional Revision was presented by Lloyd Van Doren; and those changes which were approved by the meeting were referred to the Secretary for submission to the membership.

The following resolutions were unanimously adopted:

Resolved: That the appreciation of The American Institute of Chemists, Inc., be extended to Frederick E. Breithut for his unselfish devotion

and generosity during his four years as president of the Institute; and that a copy of this resolution be spread upon the minutes and a copy forwarded to Dr. Breithut.

Resolved: That The American Institute of Chemists, Inc., expresses its great appreciation of the hearty cooperation and invaluable assistance given The American Institute of Chemists, Inc., by The Chemical Foundation, Inc.; and that a copy of this resolution be spread upon the minutes and a copy forwarded to The Chemical Foundation, Inc.

Resolved: That The American Institute of Chemists, Inc., expresses its appreciation to Edward L. Gordy for his efficient service in editing THE CHEMIST; and that a copy of this resolution be spread upon the minutes, and a copy sent to Mr. Gordy.

Resolved: That The American Institute of Chemists, Inc., at the annual meeting held on May 7, 1932, does hereby accept, confirm, and affirm all of the acts of the National Council in behalf of The American Institute of Chemists, Inc., during the year ending April 30, 1932.

HOWARD S. NEIMAN, *Secretary*

Report of the Secretary

DURING the season of 1931–32, the Council held ten council meetings with an average attendance of eleven officers and councilors, the Pennsylvania and Washington Chapters being represented at each meeting.

In my last annual report I stated that The Chemical Foundation, being in sympathy with the objectives of the Institute, had generously offered to meet the expense incident to an editor of THE CHEMIST. The Council appointed Edward L. Gordy, who assumed his position as editor with the October, 1931, issue of the Institute's publication. Under his editorship THE CHEMIST has passed from the realm of simply a record of Institute activities to a magazine of general and instructive interest to all chemists, and it is rapidly becoming recognized as an instrument for the dissemination of information of vital value to the chemists of this country. The Institute is to be congratulated upon the appointment of its present efficient editor.

The membership of the Institute is as follows:

Honorary members	6
Life members	2
Fellows	508

	Associates	66
	Juniors	64
	Total	646

The following actions were taken during the Institute year:

Elected:	Honorary members	3
	Fellows	22
	Associates	9
	Juniors	18
	Total	52
Associates raised to Fellows		5
Fellow to Associate		1
Dropped:	Fellows	22
	Associates	11
	Total	33
Resignations		15
Deceased:	Fellows	2
	Honorary member	1

It will thus be noticed that the present membership of the Institute is greater by one member than it was a year ago; and it is believed that few other similar scientific societies can show so excellent a record during the past year of economic depression.

While the Council has been lenient with those members who are financially unable to pay their dues, it has been found necessary to waive the dues of but six members.

In order to determine, if possible, the employment status of the members of the Institute, a questionnaire was sent to each member. Three hundred and seventy-eight cards were returned showing thirty-three unemployed, or about nine per cent of the returns.

In view of the educational qualifications and experience necessary for membership in the Institute, it is probable that its percentage of unemployed is less than in some of the other chemical societies.

In order to care for an estimated fifteen hundred unemployed chemists in the New York Metropolitan District, a Committee on Unemployment and Relief for Chemists and Chemical Engineers was formed under the auspices of ten of the Chemical Societies and Associations; and the

Council appropriated the sum of five hundred dollars to the Committee as its contribution toward the relief of the unemployed chemists.

Appreciating the unfavorable conditions which have existed during the past year, the officers and councilors have expended their utmost endeavors in behalf of the Institute; and the assistance they have received from many of its members has enabled them to retain it in its enviable position notwithstanding the difficulties and obstacles that have confronted it

The Council is merely a governing body, and the results of its administration are largely dependent upon the support and assistance it receives from the members, every one of whom should consider himself, or herself, a self-appointed aide, making such suggestions and giving such support as will enable the Institute to further its influence for the professional and economic advancement of American chemists.

Respectfully submitted,
HOWARD S. NEIMAN, *Secretary*

Committee on Ethics

SEVERAL meetings of the Committee were held during the year to consider amendments to the Code of Ethics. After careful deliberation the following recommendations were made to the Council and were approved:

Resolved, That Section 6 be revised to read as follows: "Advertising matter containing his name shall be dignified in tone and characterized by due scientific restraint. Such advertising matter shall not contain any statements which may tend to bring himself or his profession into disrepute. Equivocal or false statements, or statements which are liable to mislead shall not be permitted. The use of personal photographs or self-laudatory statements is condemned. If a title is used, it must be definitely characterized."

That Section 13 be revised by inserting in the second line after the word "employer" the words "as substitute."

That Section 18 be revised by adding at the end of the fourth line the following sentence: "This agreement should include a restriction of the use of reports for advertising purposes."

That a sub-section be added to Section 18 designated as Sub-section (*e*) to read as follows: "He shall not suppress information or unduly accentuate statements in reports for the purpose of making gain or profit to himself or others."

A word of explanation might not be out of place. The Committee realized that the Code of Ethics was developed after very careful and long consideration by former committees; therefore any changes in the Code should be made only after careful consideration and a study of conditions which might warrant changes to meet new conditions as they arise. With this attitude on the part of the Committee the changes which were suggested and approved by the Council are made for the purpose of clarifying or strengthening the Code.

HENRY G. KNIGHT, *Chairman*
J. F. X. HAROLD
F. W. ZERBAN

Committee on Legislation

THE supposed work of the Committee falls under the following three heads, each of which is *per se* independent of the others but none of which has been immune to the general influence of the relative depression in industrial work which has made itself increasingly felt since the fall of 1929. These heads are:

1. State or Federal Licensing of Chemists.
2. Standard Form of Employment Contract for Chemists.
3. Reclassification of Chemists in Federal or Civil Service.

Other more or less independent causes have contributed toward its being practically impossible for your Committee to make any substantial headway. Not the least effective of these has been the natural and the accidental limitations of your Committee chairman. In the first place, he is neither a mixer nor a politician, and the job requires both. His interest in the subject overruled his judgment in accepting the chairmanship when the Licensing Committee was appointed. The standard employment contract and reclassification of civil service chemists were thrust upon the Committee without his or its approval or consent and against the Committee's advice. In the second place, his own obligations to clients for the last two years have been such that it was impossible to give the time required to carry on the work properly; and they bid fair to continue so, for the near future at least. His work is more like that of the doctor or surgeon called in for special emergencies than like that of a regular employee. In these emergency periods, he has no right to consider personal preference or even ordinary private affairs and no business to accept other responsibilities that may be

forcibly interfered with for months on end. Owing to causes beyond his control, the last two years have seemed to be one long series of emergencies and have involved the preparation, or giving, or application of nearly 10,000 pages of testimony and have twice nearly landed him in the hospital. He therefore tenders his resignation to take effect at once, and expresses his approval and thanks to the other members of the Committee for their efforts to compensate for his deficiencies and handicaps.

The loss of time and progress in the Committee's business, however, has not, we think, suffered by the chairman's shortcomings as much in fact as would certainly have been the case in ordinary times, owing to the following causes:

In the licensing field practically all broadly planned and effective progress depends upon a national movement in which the engineering societies, the medical societies, and the Bar Association would cooperate. Now it so happens that at least two of these have had real troubles of their own. The first has by no means reconciled its own house on the subject of licensing. The second finds that it also has home-rule questions and problems on its hands before it can present a united front on many outside problems of much more importance to the public than ours has yet become. As stated in this Committee's report for last year, these two organizations might well present our situation to the National Bar Association in a way to make effective and reasonably uniform laws possible. Without such guidance and assistance, our own limited effort and influence would merely result in legislation which would be non-uniform, contradictory, and of little or no use toward elevating the standards of the profession. Someone else may see a path of real progress open to us. If so, we would be glad to cooperate. But be reasonably sure before entering the field to plow it up, that we have the power to harrow it and level it again, or our future path will be made only the more difficult and irregular by the mere plowing.

In the field of the employment contract, both corporations and chemists have since 1929 been much more interested in the bare facts than in any sort of form. It has been increasingly difficult for employees to maintain or chemists to secure any kind of employment. This situation may improve, but every indication is that it may be worse before it is better. We are told that this panic is "unique," "the worst in the country's history," "unprecedented," and so on. If so, the employment contract question will interest no one beyond the first two syllables.

Those who have studied the history and economic causes of the panics of 1520, 1574, 1620, 1640, 1675, 1764, 1786, 1819, 1837, 1857, 1873, 1893–1900, 1907, 1920, 1929 appear to think that it will take little less than a miracle of economy to put us on our economic feet before 1935, with the prospect of a minor depression in 1936 or 1937. Those employers who survive this period may well expect to employ on their own terms. So, we probably need not concern ourselves anxiously about haste in preparing a standard form of employment contract which we may hope some day to be in economic position to put over.

Probably the most promising object of immediate effort will be reclassification of civil service employees on a rational basis of training and competence and an effort to introduce into governmental procedure some system of eliminating yearly the less fit and replacing them by more competent. After all, what we are having today is a ghastly lesson on what governmental charity degenerates into under the pressure of political influence. Boys who never saw active service and never suffered any disability, but who are sons of well-to-do fathers active in politics, are receiving pensions while hundreds of hard-working veterans cannot even find work.

Your ineffective ex-chairman of the committee with the high sounding name therefore humbly begs leave to suggest:

(*a*) That your president appoint a chairman for that committee who knows political methods, and is a good mixer and a go-getter with no spasmodic and imperative liens on all his waking and ought-to-be-sleeping hours;

(*b*) That the committee be instructed to devote its attention:

1. To Civil Service grading and selective elimination.
2. To preparation in spare time of a standard employment contract in the hope that in a few years the economic conditions may permit its successful urging; and lastly, in the background, do what it can to cooperate with those medical men who want a society-owned and administered franchise and those engineers who desire a solid front in favor of uniform national licensing.

Respectfully submitted,
WILLIAM M. GROSVENOR
FREDERICK KENNEY
KARL M. HERSTEIN

THE CHEMIST

MOST of you already know what there is to say about THE CHEMIST—that it has been increased in size and somewhat in the scope of the articles contained. These changes have been due to two factors. The chief factor has been the cooperation of the contributing editors, of whom there are now 47, distributed through 22 states; and the gratitude of everyone connected with the office of THE CHEMIST is due the organizer of this editorial board. The other factor which has made it possible to enlarge THE CHEMIST has been the generous giving of time and effort by certain staunch supporters of the Institute, among whom I should particularly like to mention The Autocratic Chemist, who insists on remaining incognito but who is certainly one of our hardest-working and most valuable contributors.

THE CHEMIST has one or two problems. Editorially, the chief task is the collecting of material, though this is now only half a problem. At the beginning of the year we found that we had to hunt for every class of article; but we are now well fortified as regards the following types:

(*a*) Biographical sketches.
(*b*) Articles discussing the education of the chemist.
(*c*) Articles discussing the part the chemist plays in specific industries.

We still have difficulty in finding good articles on subjects of professional interest—the major reason for the existence of THE CHEMIST. Such articles may be on advertising ethics, on employment problems, or, what we should like to have most of all, articles of the sort suggested by Dr. D. P. Morgan, Jr., *i. e.*, articles in which experienced chemists in various fields discuss the prospects for the individual chemist in that field. We sent out letters to thirty-eight members, and have received thus far discussions of the prospects of the cosmetic chemist, the medical chemist, the metallurgist, and several others which will appear in future issues of THE CHEMIST. I hope we can have more material of this sort. Articles may be written under an assumed name, provided that the editor knows the identity of the author.

The advertising situation remains what it was last fall. The Chemical Foundation generously suggested that we devote our chief effort to developing THE CHEMIST. For about a month we had an advertising solicitor who worked on a commission basis; but when he found that, like most advertising solicitors, he was unable to get new advertising, he discontinued operations.

As regards development work, we are making it a practice to send out copies of THE CHEMIST to people who might be interested in specific articles. We expect to send the issue containing Dr. Morgan's article on "Business Risks" to a large number of chemical executives, as well as to some of the leading investment houses. One company bought seventy-eight copies of that issue for distribution to its executives and salesmen; and we feel that this is a legitimate way of bringing chemists to the attention of the business world.

We have made no particular drive for new subscribers since early last fall.

FOR the future, our expectations for THE CHEMIST are chiefly as follows:

We hope to carry more articles of a professional nature. This is a matter of keeping after such articles and of accepting with good grace the fact that some of our writers will veer off into technical and chemical discussion. No amount of asking for emphasis of the chemist seems to eradicate this tendency. We find that sending an article back for alterations is still less efficacious, because the author is then annoyed and, instead of making the requested changes, fails to return the article to us at all. This is a very normal human reaction in writers, even among those who are paid for their work. Naturally it is emphasized among those who are writing merely from interest.

In general, we hope in the future to devote more time to development of circulation and less to the magazine. We have reached the point where chemists who are not members of the Institute are going out of their way to volunteer articles, so that the growth of the magazine is proceeding satisfactorily.

We are always glad for criticisms or suggestions which will help to improve THE CHEMIST.

Respectfully submitted,
EDWARD L. GORDY, *Editor*

New York Chapter

THE progress of a chapter is perhaps determinable in no fixed way. There are some criteria which are indicative—for instance, the nature of programs and the attendance at meetings.

Following the policy which had characterized the first year of his administration, Mr. Frederick J. Kenney, chairman, enlisted the co-operation of a number of outstanding speakers. These men addressed

the Chapter generally on the profession of chemist, with special reference to opportunities and problems in their particular field. The policy underlying the New York Chapter meeting programs is best indicated by the following list of speakers and their subjects:

Edward L. Gordy, editor of THE CHEMIST:
"THE CHEMIST—The Voice of the Chemical Profession."
C. J. Krieger, Special Agent, Underwriters' Laboratories, New York:
"The Chemist in the Field of Fire Protection."
Edward Thomas, author of *The Law of Chemical Patents:*
"Business Meets the Chemist."
Frank G. Breyer, of Singmaster & Breyer:
"How Can Chemists and Chemical Engineers Be Consolidated as a Profession to Deal Effectively with the Present Unemployment Emergency?"
Bethune G. Klugh, Vice-President, Swann Chemical Company:
"The Chemist in the Fertilizer Industry."
Ephraim Freedman, Director, Bureau of Standards, R. H. Macy & Co.:
"The Chemist in the Department Store."

The response to programs of the type indicated by the foregoing listing has been excellent. Numerically the attendance has been gratifying. It is noted that the same members attend meetings consistently, and this may indicate conviction on their part that their time thus devoted is well spent. As these members tell more and more of their associates about programs which they consider worth while, the total attendance should become rapidly doubled or trebled.

This year the Chapter has been closely in touch with the problem of unemployment. One of its members is Mr. Frank G. Breyer, who is secretary of the Committee on Unemployment and Relief for Professional Chemists and Chemical Engineers. Mr. Walter J. Baëza, also a member of the Chapter, has been active in the work of the same unemployment committee.

On the occasion of the March meeting the Chapter cooperated with several of the other chemical societies in sponsoring the mass meeting on the subject of unemployment relief program.

In review, it appears that the New York Chapter is now well on its way to a yet more successful future. The present officers appreciate the able efforts of their predecessors and now relinquish the conduct of Chapter affairs to the able administrative hands of Dr. D. D. Jackson, Dr. J. F. X. Harold, and Mr. Samuel Newmark, the newly elected officers.

Respectfully submitted,
LEON V. QUIGLEY, *Secretary*

Pennsylvania Chapter

THE year's activities began with the meeting held September 22, 1931, at which were presented reports of the council meetings and of the Annual Meeting held at Washington, D. C. Chairman Franklin D. Jones outlined plans for the year's activities, and appointed committees.

Programs of the other meetings were as follows:

October—Professor Floyd T. Tyson of Temple University: "The Chemical Education of High School Teachers."

November—Professor Walter T. Taggart of the University of Pennsylvania described European plants and laboratories, as well as the meetings of The Society of Chemical Industry and the Faraday Society.

December—Inspection trip to the Queen Lane filters of the Philadelphia Water Department, conducted by Lyle L. Jenne.

January—Jesse Laventhal, staff correspondent of the *Philadelphia Record:*
"What Is Technical News?"

February—Dr. William Seifriz, Professor of Botany at the University of Pennsylvania:
"The Status of the Scientist in Russia."

March—Inspection trip to the University of Pennsylvania Museum, conducted by Miss Craighead.

April—Dr. Alexander O. Gettler of New York University:
"The Chemist in Medico-Legal Work."

May—Sol Feinstone:
"The Economic and Social Backgrounds of the Russian Experiment."

The Chapter is cooperating with the Technical Service Committee of the Engineers' Club on the question of unemployment, the National Council having granted a subsidy to help finance this work.

The following officers have been elected for the coming year: *Chairman*, E. F. Cayo; *Vice-Chairman*, F. T. Tyson; *Councilor*, Walter T. Taggart; *Secretary-Treasurer*, Benjamin Levitt.

Respectfully submitted,
BENJAMIN LEVITT, *Secretary*

Washington Chapter

THE first meeting of the season consisted of an inspection trip through the plant of the District of Columbia Paper Company, conducted by the Company's chemists, Mr. Kraus and Mr. Forshee.

On December 11th the Chapter divided into two groups and visited the plants of the McCormick Company and the Davison Chemical Company at Baltimore. The party left Washington at noon by auto, spent the afternoon inspecting the plants, and met for a group dinner at Weber's Café at seven o'clock. After the dinner, Dr. E. Emmet Reid, of Johns Hopkins University, spoke briefly on "Why I Became a Member of the Institute." Dr. S. M. Weisberg of Baltimore was elected to the office of vice-chairman to fill out the term of Dr. Markwood, who has removed to New York City.

The meeting of January 29th was devoted to business and to a round table discussion relevant to the position the Institute ought to take concerning the salary situation.

The February meeting of the Chapter was a joint meeting with the Washington Chemical Society. This meeting was addressed by Dr. L. V. Redman, national president of the American Chemical Society and national councilor of The American Institute of Chemists. Dr. Redman's excellent address was enjoyed by a large audience of Institute and Chemical Society members.

The final meeting of the season was a dinner held May 24th at the Cosmos Club in honor of Dr. Henry G. Knight, newly elected national president of the Institute. Dr. E. V. McCollum and Dr. H. G. Byers spoke briefly on Dr. Knight's life and achievements. At a business meeting following the dinner the following officers were elected for the coming year: *Chairman*, A. L. Mehring; *Vice-chairman*, S. M. Weisberg; *Secretary*, C. E. Senseman; *Treasurer*, J. W. McBurney. Dr. Charles E. Munroe was elected honorary chairman.

Those present at the dinner signed a parchment conveying birthday greetings to Dr. Munroe, whose 83rd birthday fell on that date. This parchment was presented to Dr. Munroe by a committee the following day.

The Chapter has had a good year in spite of the depression. The membership has remained about constant, but the meetings have been well attended and considerable interest in the work of the Chapter has been shown.

COLIN W. WHITTAKER, *Secretary*

THE NEW OFFICERS

President

Henry G. Knight received his bachelor's degree at the University of Washington in 1902, his Ph.D. at the University of Illinois in 1917. After six years as professor of chemistry and state chemist at the University of Wyoming, he spent six more years as dean of the College of Agriculture in the same state, and he held a similar position at Oklahoma Agricultural College. In 1922 he became director and research chemist of the Experiment Station at the University of West Virginia, a position he held until he was appointed chief of the U. S. Bureau of Chemistry and Soils in 1927.

Dr. Knight's writings include monographs on the following: qualitative analysis, potable waters, the effect of alkali upon seed, food adulterations, forage plants, soil nitrogen, wool, poisonous plants, digestion, soil acidity, etc. He is known as a quietly efficient executive who generally gets together a smoothly running organization.

His scientific and scholastic honors include Phi Beta Kappa and Sigma Xi. An enthusiastic golfer, he is also fond of motoring. He is a member of the Cosmos Club.

Vice-President

Moses Leverock Crossley went to Brown for his graduate as well as his undergraduate work and stayed on for two years as associate professor before going to Wesleyan, where he became head of the department of chemistry. Since 1918 he has been chief chemist of the Calco Chemical Company.

Dr. Crossley's chief chemical interests are: amidoanthraquinones and anthraquinone sulphonic acids; the dye industry; nitro-cyclic compounds; phosphorus as an index of nerve

metabolism; chemical physiology of human hair; valency; color and constitution. Other activities include service as a consulting chemist for the Middlesex Hospital and much fine work for The American Institute of Chemists, of whose Committee on Professional Education he is chairman.

Among his colleagues Dr. Crossley is noted for his clear thinking, for the tenacity with which he insists upon high professional standards, and for his unselfish contribution of time and effort to causes in which he is interested. He is a member of The Chemists' Club, and he plays golf as his chief recreation.

Secretary

Howard S. Neiman was graduated from Lehigh University and went immediately into the dye industry. At the age of 23 he became superintendent of the Albany Coal-Tar Dye and Chemical Company, and later served as chemical expert for Leopold Cassella & Co., Wm. J. Matheson & Co., H. A. Metz & Co., Matheson White Lead Co., and a number of other chemical companies. He has published many papers on organic chemistry and coal-tar dyes. For the last twenty-four years he has been editor of the *Textile Colorist*, of which he is now owner.

Becoming interested in patents, Mr. Neiman found that his logical and ingenious mind was well fitted for patent law. He became a patent attorney and now is the leading legal adviser for the cosmetic industry, though he also has an extended clientele in other chemical and mechanical lines.

Mr. Neiman is secretary of the Pleiades Club, and has long been fond of art and music. Intensely interested in his fellowmen, he has an unusually wide circle of devoted friends, among whom he is known for his unfailing sympathy and for his ability as a raconteur.

Mr. Neiman is a member of The Chemists' Club and the Manhasset Bay Yacht Club. He spends his summers on his houseboat in Long Island Sound.

Treasurer

David Percy Morgan, Jr. (Harvard '16), received his Ph.D. from Columbia in 1923. After one year as national research fellow at the Harvard Medical School, doing research on immunology, he spent four years as a consulting chemist, dealing principally with colloids. Banking houses learned that they could trust his judgment as regards investments in chemical processes and chemical research. He is now commercial research expert with Scudder, Stevens, and Clark.

Dr. Morgan was captain of the 1916 Harvard crew, which beat Yale at New London and set the present record for the course. During the war he received the Navy Cross for "distinguished and heroic service as an aviator...attached to the Northern Bombing Group."

A member of the Association of Consulting Chemists and Chemical Engineers, Dr. Morgan belongs to a number of other scientific societies and is secretary-treasurer of the New York Section of the American Chemical Society. His academic honors include Sigma Xi.

He plays squash but takes his golf more seriously. His chief other hobby is sea-chanteys, of which he learned a great many from an old salt during his service in the navy. He finds them useful on his annual yachting trip with a group of college cronies.

National Councilors

D. D. Jackson is head of the department of chemical engineering at Columbia, and is an authority on municipal water plants. He was chemist and director of laboratories for several such plants before he entered teaching in 1911.

As an active participant in the organization of the Unemployment Committee, Dr. Jackson is closely in touch with the greatest present problem of chemists. He has just been elected chairman of the New York Chapter of the Institute.

Dr. Jackson likes fishing and golf, and formerly spent much time in hunting the big game of North America.

Frederick Kenney has been a chemist in various departments of New York City since 1904. He is now chief chemist of the Department of Purchase Testing Laboratories.

Active in the profession, Mr. Kenney for the past two years has been chairman of the New York Chapter of The American Institute of Chemists as well as a member of several Institute committees. He is chairman of the Committee on Admissions of The Chemists' Club.

Mr. Kenney is a member of Phi Sigma Kappa and a former member of the Seventh Regiment. He lives on Long Island, plays golf at Old Westbury.

Albert Parsons Sachs is a Columbia graduate whose best-known invention, among laymen, is Larvex. Among chemists Mr. Sachs is known as an unusually cosmopolitan and cultured scientist. His hobbies are chess, tennis, and the collecting of fine books. An avocation is writing, at which he is notably proficient.

Mr. Sachs is no newcomer to the National Council. He has just completed a three-year term; and he has also served on a number of Institute committees. His last term was characterized by his willingness to work and by the intelligent, strictly independent views he expressed.

A former editor of THE CHEMIST, Mr. Sachs did much to develop the Institute's magazine.

Chemists of the Patent Office

By Joseph Rossman

Some of the duties and some of the difficulties of the examiners of chemical patents. The importance of patents and the patent literature.

AMERICAN chemists may well be proud of the fact that the earliest patent granted in the United States was issued in 1641 by the General Court of the Massachusetts Bay Colony to Samuel Winslow for a process of manufacturing salt. This patent recited that he was to have the privilege for ten years, on condition that works were established within one year; and it prohibited all others "from making this article except in a manner different from his."

Another notable patent granted in Massachusetts during Colonial days was the one issued in 1656 to John Winthrop, Jr., the son of Governor Winthrop. This also was a chemical patent for a process of making salt and it gave him the "sole privilege of manufacturing salt after his particular method" for a term of twenty-one years.

Chemical patents thus have had an unusually early start in this country. Our industrial development until recently, however, was predominantly mechanical and electrical rather than chemical. Even prior to the war our captains of industry hesitated to invest capital in chemical enterprises, probably because chemical processes could be understood by them only with great difficulty and chemical inventions seemed at best too intangible to be worth while. Thanks to the War this attitude has practically disappeared, so that today chemical inventions are considered as very important factors in our industrial development.

During the last hundred years chemical patents have been issuing at a steady and growing pace. About sixty years ago the patent applications for chemical inventions filed in the Patent Office appeared to become so

highly technical and complex that the Commissioner of Patents decided to appoint Professor Hedrick as a general chemical examiner to whom were referred "all questions of novelty involving chemical compounds, chemical mixtures, and chemical processes, in whatever class they may arise." Since then the number of chemical patent applications has increased at such a fast rate that today it would be utterly impossible for one man to pass upon the novelty of all the chemical applications submitted to the Patent Office.

Patents Show Industrial Growth

The growth of any given industry is always recorded in the patent literature; and the chemical industry, in spite of lending itself to secrecy, has been no exception to this rule. The tremendous growth of the American chemical industry, especially since the War, is reflected by the thousands of chemical patent applications now awaiting action in the Patent Office. At present nearly 18 per cent of all the pending applications involve chemical inventions; and about 80 chemists in the Patent Office are now busily engaged in searching the prior literature, including patents, in order to determine the novelty of the inventions described and claimed in these applications.

The chemist in the Patent Office has a most difficult task. He must

AIR VIEW OF DEPARTMENT OF COMMERCE BUILDING

act at the same time as judge, jury, prosecutor, and executioner. He is also not servant to one master but to many. First of all, he must look out for the interests of the public. Every newly issued patent gives its owner the right to exclude the public from the use of the invention covered by the patent for a period of seventeen years. Obviously it is an extremely responsible duty on the part of the examiner not to allow the issuance of any patents which are anticipated by the extant literature. Should a patent be issued which is clearly anticipated it will be held invalid by the courts. However, serious harm may result, for the defendant in a suit upon such a patent must definitely prove that it is anticipated. The issuance of invalid patents thus places a heavy burden upon the public. The examiner, therefore, cannot be too careful in searching the available chemical literature before issuing a patent. As every chemist knows, this is no easy task today, for the chemical literature is voluminous and there is no single available index which contains all the necessary references.

Need for Digest of Chemical Patents

When Professor Hedrick was appointed general chemical examiner in 1874, he was also instructed to "prepare a thorough and well-classified digest of all American patents pertaining to chemical compounds, mixtures, and processes." If this instruction had been faithfully carried out the Patent Office would have today a much-needed digest of its chemical patents. Unfortunately, lack of appropriations by Congress, insufficient personnel, and a growing flood of patent applications have effectively prevented the preparation of any working digest of chemical patents.

In 1899 another attempt was made by the Patent Office under the direction of Dr. Edwin A. Hill to compile a card index of chemical formulas with references to the literature. Over a million cards were prepared by 1920, but due to inadequate appropriations the work was halted and it was never resumed. The chemical examiner today must therefore painfully search the prior literature bearing on each patent application in order to ascertain whether the claims are anticipated in any way, without having the aid of the complete and dependable digests which he should unquestionably have available. The Patent Office has classified its approximately two million U. S. patents, including millions of foreign patents, into about 300 main classes which are subdivided further into subclasses. Many of these classes are badly in need of revision—especially the chemical classes. A bill has been recently proposed in Congress providing for 35 examiners of classification, who would revise the classification of the patents. It is doubtful, however,

VIEW FROM 14TH AND PENNSYLVANIA AVENUE

whether Congress in its present mood of economy will allow any increased expenditures. The result will be a more and more unwieldy patent classification. The examiner faced by hopeless piles of patents and other literature, with only a limited amount of time, cannot possibly make the thorough and adequate searches which are imperative for such important matters as the determination of the novelty of an invention.

A Patent Examiner's Schedule

Under the present pressure of work, with a total of about 80,000 applications awaiting action, each examiner is expected to act on about 12 applications per week consisting of 39 working hours. Allowing only one hour each day for interviews and other miscellaneous matters the examiner has $2^3/_4$ hours to devote to each application. In this time he must study and analyze the invention, carefully study the claims, search through all the available patents, U. S. and foreign, through textbooks, periodicals, etc., and finally write an official letter stating the results of his investigation and acting on the merits of the application.

The chemical industry clearly expects miracles of the examiner if it seeks to obtain perfect patents today under present working conditions in the Patent Office. It is only due to hard work, conscientious application, and a serious respect for his profession that the chemist in the Patent Office is able to turn out as good work as he does. It is clearly the duty of the chemical industry to take some concerted action to provide better facilities to the chemist in the Patent Office, to give him all the possible assistance in making his literature searches, and above all to permit him to devote ample time for each case upon which he must act.

MAIN LOBBY

Not knowing the handicaps under which the chemist-examiner labors, it would be but natural to criticise his work. This is a favorite pastime in chemical circles. Patents represent commercial property amounting to untold wealth. They should be accorded the same consideration as other valuable property is always given. Our chemical industry today is largely operating under patents; and it is therefore the most important duty of the industry to urge Congress to give the Patent Office every facility which it needs in the way of personnel, equipment, library service, etc., so that it may issue water-tight patents.

Recent Improvement in Patents

Many older patent attorneys have observed that chemical patents during recent years have greatly improved in quality. This is largely due to the corps of chemists in the Patent Office who are graduates from recognized colleges, where they have received a fundamental training in chemistry. Many of the examiners have also had several years' experience in the industry before coming to the Patent Office. This training is of utmost importance to the examiners in their work as they must pass upon the merits of all chemical inventions on paper and not by laboratory test. The Patent Office has no laboratory where it can verify the statements made in applications. Should a process appear to

be inoperative or impossible the examiner will reject the application until the inventor proves to his satisfaction that the process will work. This is usually done by introducing evidence such as experimental data, photographs, samples, or statements of experts.

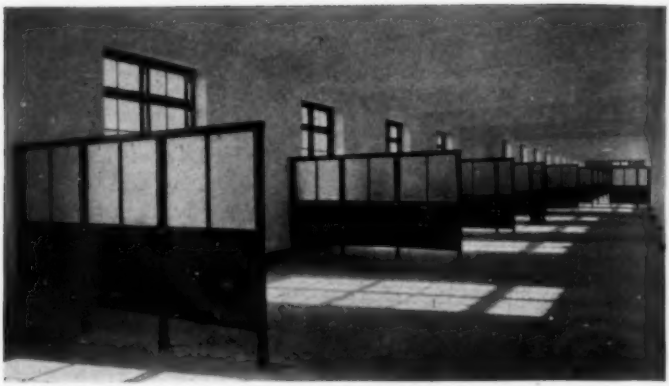
Besides a thorough knowledge of chemistry the examiner must also have a grasp of the principles of law, particularly as they apply to patents. A patent is a complicated legal document, and the ultimate protection which it gives its owner depends largely upon the skill and experience of the patent attorney who has prepared it. It is sheer folly for a chemist having no thorough knowledge of patent law to attempt to prosecute his own patent. Many valuable inventions have failed to bring adequate returns to their owners because they were poorly drawn up and prosecuted.

Competent Patent Attorney Necessary

In one of its official bulletins the Patent Office states: "The inventor, therefore, is advised to employ a competent, registered patent attorney, as without skillful preparation of the specification and claims a patent grant is of doubtful character." It is also essential that a patent attorney handling chemical cases have a thorough knowledge of chemistry. Otherwise his work will be of questionable value.

Our present patent system is nearly a hundred years old. During this time thousands of decisions have been published by the Patent Office and the courts which have interpreted the basic patent statutes and the proper methods of procedure to be followed. These legal precedents must be followed as closely as possible; and it is therefore essential for the examiner to be familiar with at least that portion of patent law which relates to his work. For this reason many of the chemists who enter the Patent Office attend evening classes in the local law schools until they obtain their LL.B. and pass the bar examinations.

The purpose of patents as expressed in the Constitution is "to promote the progress of science and the useful arts." Every patent which is granted is printed and made available to the public as a publication which is sold at ten cents a copy. The information contained in the patents has been of great stimulative value to the industry. With the tremendous growth of technical books and periodicals the educational rôle of patents is perhaps not as great as it was a hundred years ago. But even today the latest and sometimes the only available information on a given subject can be found only in the patent literature. No survey of the literature is ever complete without a thorough investigation of the related patents. The tremendous importance of patents in the



EXAMINERS' ROOMS

chemical literature can be seen from the fact that 40 per cent of the 53,997 entries in *Chemical Abstracts* for 1930 were for patents.

To the chemist in the industry the mixture of law and chemistry which is daily concocted in the Patent Office by the chemical patent examiners may seem to be a strange combination. Patent law itself has been dubbed as the metaphysics of law on account of its intricacy and difficulty. But those who are engaged in chemical patent work find it a most fascinating calling. The reasons for this have been well expressed by Chief Justice Hughes in an address to the American Patent Law Association:

"...Scorning the futilities of politics, eschewing the vain contrivances of the lesser breeds within the law (if I may take this liberty with Kipling's phrase in order to suit your case) you indulge in the severest intellectual exercise and live among the most cherished illusions of scientific uncertainties. I have always thought that those who were absorbed in scientific pursuits should be the happiest of men, for they take their nepenthe daily. While you may not rise to the higher levels of pure science, you have the advantage of intimate association with the developments of scientific knowledge which attest the march of civilization, and with the play of inventive skill which more than all the devices of legislative interventions raises the standards of human life. If continuous intellectual interest and the exercise to full capacity of the powers of the mind can bring satisfaction, you should have it in the largest degree."

Chemistry and the United Fruit

By Hartley Rowe

The vice-president in charge of the research program of the greatest fruit company tells about its special problems. Some of the profits of chemical research.

SCIENCE has played an important rôle in the development of the United Fruit Company, and especially is this true of chemistry and allied sciences. Of first importance is the adequate protection of the health of employees in tropical environment, which has necessitated a careful study of sanitation and tropical medicine. Before the plantations are laid out the various soils are carefully tested.

Successful transportation of bananas to distant markets by sea and land is predicated on keeping the fruit in condition for suitable ripening on arrival. In the ripening rooms temperature, humidity, and ventilation are controlled to promote the ripening process and to put on the market bananas of maximum food value and flavor. Many difficult problems have been encountered in developing the banana industry to its present state; and in the solving of these problems research and chemistry have played an important part.

Résumé of Company's Operations

A brief review of the activities of the United Fruit Company will show the opportunity and need for applied science. On its plantations about the Caribbean, the company and its subsidiaries produce bananas, sugar, cacao, and coconuts. For transportation in the tropics the company operates railways; and its fleet of approximately one hundred steamships—the majority of which are refrigerated—carries its products to

CHIQUEROS AERIAL TRAM

developed markets in North America and Europe. Through its subsidiary, the Tropical Radio Telegraph Company, it maintains a radio communication system between the Caribbean countries and the United States, which serves not only the company but the general public as well.

The company conducts an extensive steamship freight and passenger business, and in conjunction with the latter owns and operates two hotels in Jamaica. In Central America, Colombia, and Cuba it does a large merchandise business. It has extensive sugar operations, which will be touched upon later. For the benefit of its personnel in the tropics it maintains water works, electric light and ice plants, laundries, and bakeries. The company buys a great number and variety of materials. This requires a highly organized purchasing department with branches in many commercial centers.

The company maintains agricultural experiment stations where large-scale investigations of soils, tropical plants, plant diseases, and pests are conducted. At its principal experimental station, in Honduras, the general collection of tropical plants, carefully studied under natural conditions, is probably the largest of its kind in the American tropics. Its collection of different varieties of bananas, secured from all parts of the tropical world, is the most nearly complete of any in existence.

The company maintains and operates at New York, under the direction of J. N. Kelley and G. L. Poland, an analytical and physical

laboratory for testing many of the company's purchases; also a research laboratory and experimental banana ripening rooms where problems of transportation, ripening, and marketing are studied constantly. In these laboratories, studies are also carried on with various products and materials originating in the tropics, with a view to developing new uses for them in the markets of the world.

Prior to the establishment of a research department with its various laboratories as an integral part of the company's organization, Arthur D. Little, Inc., of Cambridge, Massachusetts, and, later, Skinner & Sherman, Inc., of Boston, served for several years as its consulting chemical engineers.

Sanitation and Medical Research

Chemotherapy has been an important factor in the progress of tropical medicine. The development of all tropical enterprises, and especially the banana industry, has depended to a great extent upon the control of tropical diseases. It is in the lowlands of Central America—the seat of the ancient Mayan Empire—extending a few miles back from the Caribbean Sea, at an elevation not more than 250 feet above sea level, where there are hot days and humid nights and an annual rainfall of 80 to 200 inches, that the jungle has given way to the greatest banana farms in the world.

In such a country and climate Minor C. Keith (later the first vice-president of the United Fruit Company), in the eighteen seventies, in completing the first twenty-five miles of the railroad from Port Limon to San Jose, Costa Rica, lost four thousand men, including his three brothers. In nine years (from 1881 to 1889) the French, in their heroic attempt to build the canal in Panama, lost 22,000 men.

The outlook seemed well nigh hopeless when in Cuba in 1898, Dr. Walter Reed and his companions, Carroll, Lazear, and Agramonte, solved the yellow fever problem. Thus the road to commercial success, closed for centuries by the unhealthful, insanitary conditions in the lowlands bordering the Caribbean Sea, was opened. In Havana, Gorgas and Wood had tested the new plan of sanitation, based on fighting the germ-carrying mosquito, and proved it sound. Later, in 1904, Gorgas put these plans into operation in Panama in the work for sanitation which made the Canal possible.

Meanwhile, the physicians of the United Fruit Company at Bocas del Toro, Panama, and later at Port Limon, Costa Rica, were carrying out the measures inaugurated by Reed and his colleagues, to whom, in

EXTRACTING THE VENOM

his first official report, the medical director of the company paid the following tribute:

> "The United Fruit Company here extends its homage to Dr. Walter Reed and his corps of heroes, who furnished the world, and indirectly our company, with a few simple facts relative to the transmission of yellow fever....The battle was fought in this Division (Panama), and so positive the result, so convincing the experiment, that these tried-out measures have been extended to all tropical developments of the company."

Hospital service was first inaugurated by the company at Bocas del Toro, in August, 1899. Today the company has an extensive system of hospitals and dispensaries for the benefit of employees and their dependents, as well as for other inhabitants in or adjacent to the plantations.

Thus from the beginning the United Fruit Company realized the necessity of combating insanitary conditions in the tropics, and for more than thirty years has carried forward a relentless warfare against disease. Yellow fever has been eliminated; epidemics of smallpox no longer occur; and the influence of other fatal or debilitating diseases has been greatly reduced. While malaria, hookworm, and dysentery are

still problems of considerable importance, definite progress in their control is being made from year to year, and the localities where the company operates now show health records which compare favorably with those of communities in the temperate zone.

The activities of the company's medical department were strikingly brought to the attention of the world at an international conference on health problems in tropical America, held at Kingston, Jamaica, in July, 1924, to which eminent and active workers, representing all phases of medical and sanitary sciences connected with medicine, came from the four quarters of the globe as guests of the company. Following the scientific sessions at the company's hotel at Kingston, the members of the conference were given an opportunity to inspect the medical and sanitary work of the company in its Central American divisions. The proceedings of this round table gathering of experts were then published and distributed gratis by the company to the medical world.

The need for an available supply of specific antivenins as antidotes for the bites of the various poisonous snakes encountered in the coastal regions of Central America and the north coast of South America, led to a cooperative plan, developed by three chief contributors: Dr. Thomas Barbour, of the Museum of Comparative Zoology, Harvard University; the United Fruit Company; and the Mulford Biological Laboratories in Philadelphia. Their united efforts resulted in the establishment of the Snake Farm in Honduras—where the venom of the snakes is periodically extracted—and of the Antivenin Institute of America, at Glenolden, Pa., where the antivenins are produced.

The medical department of the company is directed by Dr. R. C. Connor, successor to the late Dr. W. E. Deeks, whose work in tropical medicine is internationally known. Both of these men were formerly associated with the late General Gorgas on the Canal Zone. The work of this department is both varied and extensive and offers unusual opportunities for the study of tropical problems and the investigation of rare diseases and exotic infections.

The Rôle of Chemistry on the Banana Farm

Bananas grow best in fine, sandy loam; good underdrainage and aeration are essential. The water requirements of the fruit are enormous. In certain districts, where the rainfall is insufficient and there is an abundant water supply available, irrigation is practiced.

During the early years of the industry agricultural practices were naturally primitive, for along the shores of the Caribbean agriculture

as a science is still young. As the industry developed, it became apparent that great economies might be effected in the selection and maintenance of lands if more were known regarding the relation of the banana plant to the soil upon which it is grown.

Professor Samuel F. Prescott, of the Massachusetts Institute of Technology, was asked by the United Fruit Company to undertake a series of investigations. Commencing about 1915 an immense number of soil analyses were made under his direction. This work served to place on record a large body of information which has proved of constant value ever since.

Since 1920, Professor Lewis Knudson, of Cornell University, has been employed by the company in the capacity of research consultant. He has made numerous trips to the tropics, paying especial attention to such subjects as soil reaction and nitrogen in relation to the banana, chemical weed eradication, and other problems, out of which have come a number of standard practices.

THE EFFECT OF IMPROPER HUMIDITY

The first soil chemist to be stationed permanently in the tropics was Dr. Oscar Magistad, who worked under the direction of Dr. John R. Johnston, Director of Agricultural Research at Boston. During the time Dr. Magistad was stationed at Tela, Honduras, a research laboratory was organized. Also during this time, the United Fruit Company inaugurated the systematic soil surveys which have since been generally applied. This application of the science of soil chemistry to the selection of lands for banana planting is one of the most important single developments which the industry has seen to date.

The laboratory at Tela grew rapidly, and its activities soon covered a wide range of problems. For example, some of the clay soils found in the banana regions had proved refractory. Investigations of fundamental character, involving the colloids of these soils, were undertaken, looking toward the solution of the agricultural problems which such soils present.

LABORATORY, CENTRAL PRESTON, CUBA

These and other investigations have been continued under the direction of George Scarseth, Dr. L. C. Wheeting, and W. W. Pate, who have succeeded Dr. Magistad in charge of the Tela Laboratory.

Chemistry has assisted in the studies of the water requirements of the banana plant and of the quality of water used for irrigation. The type of soil determines the distance of planting, extent of drainage required, amount of pruning, and shade relations, all of which are reflected in the quality of fruit. In all of this work the soil chemists and pathologists have contributed fundamental data on which the agricultural and engineering operations are based. The commercial value of this work is unquestionable, as the quality and quantity of the fruit produced per unit of area has been shown to be in direct relation to the knowledge gained by these studies.

All of this scientific work is carried on under the supervision of Dr. John R. Johnston, Dr. Wilson Popenoe, and Dr. Otto B. Reinking, and is directed by the vice-president in charge of research.

Marine Research

Much valuable research has been done in the field of ocean transportation of bananas. The practical results of this research are clearly shown in the six new American ships recently built under the Jones-White Act. These vessels have established an economical operation that is very satisfactory. Not only have they developed an exceedingly low fuel consumption per horse power, but the horse power tons dis-

placement and the space available for requirements of efficient banana transportation are better than any previously established standard.

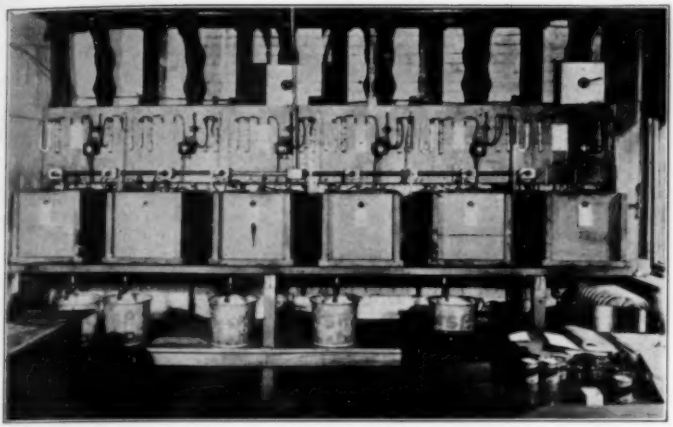
The new system of air circulation installed in these six United Mail Steamships, in comparison with that previously in vogue, increases the available cubic capacity for the carriage of bananas 10%. The new system eliminates the short-circuiting of air, prevents the formation of air pockets, and avoids stratification of air. By requiring less circulation than the previous system, it also uses less fan power, with a consequent economy in refrigeration power and a saving in fruit shrinkage.

The savings to the United Fruit Company through these developments, when applied to its entire fleet, exceed the overhead of both the marine and research departments. For these outstanding improvements in ocean transportation, great credit is due H. Harris Robson, general manager of the marine department.

Banana Ripening a Chemical Problem

Without the efforts of workers in the science of chemistry bananas would not be imported today and would be of importance only in the regions where the fruit is grown. Bananas belong to the class of fruits which improve during storage, in the sense that proper commercial ripening is possible only when the fruit is harvested in a green condition. The protopectins, which in the green fruit bind the pulp cells into one solid mass, are converted in the course of ripening into water-soluble pectin. This change is responsible for the mellow consistency of properly ripened bananas. At the same time the large amount of starch present in the green fruit is gradually converted into sugars, which predominate in the ripe fruit. This conversion is accompanied by an intake of oxygen through stomates in the peel and by the evolution of carbon dioxide and heat. It is essential that these chemical changes in the banana be inhibited during transportation in such a manner that later the fruit will readily respond to the stimulus of standard conditions of temperature, humidity, and ventilation in the ripening chambers.

Until the United Fruit Company established its own research laboratories, probably the most complete and reliable study of the ripening process was made by H. C. Gore by means of a respiration calorimeter, with simultaneous determinations of chemical composition and of the carbon dioxide and heat evolved. For the past few years the company has operated continuously a battery of respiration chambers and a number of experimental ripening rooms in conjunction with studies in its analytical, biological, and biochemical laboratories.



BATTERY OF RESPIRATION CHAMBERS, RESEARCH LABORATORY

The information thus obtained has been applied to many practical problems. For example, the amount of refrigeration required to absorb the heat generated by bananas at any degree of ripeness is calculated from the rate at which carbon dioxide is evolved at that particular stage. In a similar way, measurement of the concentration of carbon dioxide in the holds of steamships is used as a measure for controlling the operation of the ventilating equipment. Thus, the chemistry of the fruit is closely linked with the control of shrinkage and deterioration during transportation. Careful measurements of chemical activity have made possible the modernization of refrigerating and ventilating equipment employed in marine and rail transportation, as well as that used in ripening rooms.

Chemistry has made a distinct contribution in solving the problems of the many companies and individuals merchandising bananas who must regulate the ripening of their fruit to meet a varying demand. An example is the use of ethylene gas, which is employed as an agent to accelerate the rate of ripening where advisable. The effect of this gas was first discovered through chemical studies in connection with citrus fruits and was, after careful investigation, applied in the banana trade as a means of supplying the consumer with the best fruit possible on the day desired.

Banana Dietetic Research

The remarkable progress of the science of nutrition during the past twenty years has had a direct effect on the vendors of food products.

MODERN RIPENING ROOM WITH AUTOMATIC AIR CONDITIONING UNIT

No longer is the public satisfied with palatability as the appeal for purchase; it demands facts as to food values. To supply such facts in regard to the banana has necessitated the combined efforts of clinicians and physiological chemists.

The United Fruit Company's dietetic research is directed by Walter H. Eddy, Ph.D., Professor of Physiological Chemistry in Teachers' College, Columbia University. Work under his direction has provided authoritative data on the vitamin, protein, and mineral contributions of the banana and on its digestibility and utilization by both adults and children. These data, painstakingly evolved by an extensive series of biochemical researches, have gained for the company the approval of the Committee on Foods of the American Medical Association. The following extract from their announcement indicates some of the significant facts now recognized:

> The following statements used as a basis of claims in promotion of bananas have been accepted: The banana is available at all seasons. Ripe bananas, or if cooked when partially ripe, are readily digestible even by infants and are valuable for modifying infant milk formulas because of the unique combination of readily assimilable sugars and vitamin C and are an aid against constipation.
>
> The banana is a good source of vitamins A and C . . . Vitamins B, G, and E are also present."
>
> —*The Journal of the American Medical Association, December 19, 1931.*

The housewife is now buying bananas because these facts have demonstrated that this fruit supplies important factors for health maintenance; and her doctor is supporting her in such purchase.

The facts already obtained testify to the value of biochemistry as a tool of industry; and its application to the study of the banana is therefore being extended by the Fruit Company. How do the banana enzymes convert the green pulp into the digestible product of the table? Dr. John M. Nelson, Professor of Biological Chemistry, Columbia University, is studying this problem for the Fruit Company; and this enzyme chemistry may materially advance mechanical control of banana ripening. What becomes of the tannin in the green fruit as ripening proceeds, and how is it rendered harmless to human stomachs? Research into the banana protein, its power to bind this tannin and how it is accomplished, is in progress and promises a solution of this problem.

THE STAMP OF APPROVAL

Banana pulp has value in changing bacterial flora, in controlling tendencies toward acid blood (acidosis), and in regulating the digestive machinery. Dr. Lloyd Arnold of the University of Illinois Medical College is studying these procedures and assembling data which explain them.

These are only a few of the studies now projected in which dietetic research by biochemists, organic chemists, bacteriologists, and physiologists has been enlisted under the company's policy of fact finding.

Chemical Control of Materials

Aside from their direct bearing on growth and distribution of tropical products, chemistry and chemical engineering have been important factors in various accessory activities of the company. The potability of the available water supplies in its tropical divisions varies greatly. In certain districts it has been necessary to install filtration and treating plants. The treatment of water for boiler purposes, through proper chemical methods for controlling hardness and scale-forming elements, has been of prime economic importance.

Many problems have confronted the industry in combating unusual conditions of corrosion in the tropics, in order to secure the preservation of timbers and the protection of materials from the ravages of marine borers, termites, and other destructive animal and insect life. In many instances, where the usual remedy could not be applied on account of some peculiar condition, careful investigation was required. Suitable

impregnating material for paper wrapping, pads, and lumber, used in contact with bananas, were among these problems. Because of the ease with which the peel of the fruit is injured, surfaces with which it comes in contact must be unctuous and must have chemical stability. For finishing domestic ripening rooms, chemical investigation was necessary to develop paints and protective coatings which would not impart undesirable odors and flavors to the fruit.

Chemistry again plays an important part in the standardization of materials for the company's use. Oils, paints, and greases must be properly compounded to give the greatest service under variable tropical conditions. Building materials, roofing, and non-corrosive materials are selected after a careful investigation of the properties essential to long life and adequate service.

Sugar Also a Product

It is not commonly known that the United Fruit Company controls an integrated sugar enterprise. In Oriente Province, in Cuba, it operates at the seaboard two large modern mills, with a well-balanced acreage in sugar cane. Its fleet transports the raw sugar direct to its subsidiary, the Revere Sugar Refinery, situated on deep water in the Charlestown district of Boston.

In no other industry is strict chemical control more essential. At the Cuban end this control involves keeping an exact account of the sucrose entering the factory in the form of crude material—cane—and of the sucrose leaving the mill in the form of finished product—raw sugar—as well as of the losses of sucrose in the bagasse and in the final molasses. This work requires that all weights and measurements be accurately taken and that the material in process at the various stations throughout the factory be properly sampled and carefully analyzed.

At the refinery the raw sugar, which is unsuitable for direct consumption, is first purified and then transformed into the different grades demanded by the individual taste and requirements of the consumer. Each crystal of refined sugar is of identical composition and analyzes practically 100% pure. Each step in the refinery process is controlled continually and carefully by the chemical laboratory, which also carries on a certain amount of research work.

Cacao

In its Costa Rica and Panama divisions the company has a considerable acreage in cacao. To produce the bean and market it successfully in the face of existing competition, it is necessary to have a product in

CATERPILLAR WHEELS A PART OF MODERN BANANA FARMING

quality equal to or better than that already on the market. Here again, chemical analysis and control are fundamental. A major portion of the world supply of cacao is fermented by crude methods and is sun-dried. Ordinary cacao sells at a low price. Improvement in fermentation methods and drying under exact conditions produce a better bean which commands a higher price. The company, through prolonged scientific studies, has materially improved the quality of its cacao by these means.

Conclusion

The company has cooperated with the Tropical Forestry Department of Yale University in making a survey of timbers in Central America, under the direction of Professor Samuel J. Record.

The increasing use of cellulosic material by various industries has stimulated the investigation of the cellulose content of many tropical fibers, and the company's chemists and research workers are constantly studying this important field to determine products of economic value. The company recently obtained patents on a process covering the preparation of alpha cellulose from raw materials found in plentiful supply in the Caribbean countries.

The dehydration by spray-drying of ripe banana pulp has been carefully studied by the company's chemical engineers. An experimental

plant has recently been built in Boston which has turned out an excellent product with good keeping qualities. Hospital physicians who have used this banana powder in infant feeding report favorable results. The product has also created considerable interest for other food uses.

Farming in the tropics, as elsewhere, produces considerable waste material, and the utilization of this material offers varied opportunities for research. The company's chemists are constantly studying these problems. The rewards of chemical endeavor so far realized demonstrate that the American tropics offer now, more than ever before, a fruitful and tempting field for the chemist.

Positions Wanted

The following chemists are available for positions. Further information will be furnished upon application to The American Institute of Chemists, 233 Broadway, New York, N. Y.

101-XX	Chemist experienced in analysis of metals, rubber, paper. Some research experience.
101-QT	Ph.D. with wide experience in food products. Head of laboratories of various canning companies.
101-PQ	Chemistry professor. 15 years' teaching experience.
101-IN	Chemical engineer experienced in high vacuum and the chemistry of air gases.
101-ZN	Research and plant chemist experienced in cement, leather, high explosives, acids, fertilizers.
101-MO	Research chemist experienced in explosives, dye intermediates, acids.
101-HW	Paper chemist, research and development work.
101-DP	Recent graduate, industrial position.
101-ID	Chemical engineer, nine years' experience plant work and management.
111-NQ	Chemist, 11 years' experience. Research, analysis of metals.
111-OX	Organic chemist, experienced as chief chemist and director of research.

The First Synthetic Dye

By E. Lucie Weart

The story of William Perkin, one of the fathers of modern synthetic chemistry. Some of the results of his discovery.

IN 1856 the World War was born in the test-tube of eighteen-year-old William Perkin. An exaggeration? Perhaps, yet the World War would have been a different kind of an affair entirely had not young Perkin made the discoveries he did, some seventy-five years ago. Indeed, in many ways the world itself would be a different place.

A visit to a friend's house when he was only fourteen was directly responsible for the experiments which later led to tremendous changes in the science of chemistry. He witnessed on this little holiday some chemical experiments and was fascinated by what he saw, just as any fourteen-year-old boy is excited by the things he can do with the chemical set he was given at Christmas. His father had intended William to be an architect—he himself was a builder—but after this experience the boy decided differently. It was with some difficulty that he received permission to attend the lectures of the great Faraday, and to join the student body of the Royal College of Science in London.

In those days there was less chemistry for a youngster to learn, so William at the age of eighteen knew enough to become an instructor. He was assigned by his chief, Professor Hofmann, to the task of making quinine from coal tar—a problem which, by the way, has even yet not been solved. Though the young boy was delighted with his new position he soon found it meant a great deal of routine work and very little research. So he fitted up a little laboratory for himself at his home, and there he worked whenever he had a spare moment. It was there, at his Easter vacation in 1856, that his first important discovery was made.

One evening at the end of a long day's work, with no progress made on the quinine problem, he had, as his only result, a beaker full of a dirty mass of aniline oil and other chemicals. He should, of course, have thrown it away and gone to his dinner. Indeed, he started to, but for some reason decided instead to fill the beaker with alcohol. A beautiful deep purple color was the result, to his bewildered surprise. Whatever he had expected—and it really had been quite an idle gesture—he had not anticipated this. Here was something new, something he did not understand. Unwittingly he had made the first synthetic coal-tar dye. It was really nothing but chance; for, had the aniline oil been pure, no color would have developed. There was present as an impurity a little of another coal-tar product—toluidine.

HAD Perkin been able to look into the future his amazement would have been even greater. From his accidental discovery came: all the colors of the rainbow; the most delicate perfumes known to nature; explosives of the battle-field; the healing preparations of the hospital; drugs for allaying pain and fever; preservatives and antiseptics; and photographic chemicals.

It sounds impossible, yet it is true. When Perkin made the first dye he showed other chemists that it was possible for them to do more than analyze substances, that they could create them. He officiated at a new birth of the science, created a revival of interest which started research along many lines. His discovery, with those he made later, was the basis for all of modern organic chemistry. Previously coal tar had been considered a sticky, dirty nuisance, something left over in test-tube and flask which made the glassware very difficult to clean. Now chemists were to discover that it was a veritable gold mine. As *Punch* put it,

> "There's hardly a thing that a man can name
> Of use or beauty in life's small game
> But you can extract in alembic or jar
> From the 'physical basis' of black coal tar—
> Oil and ointment, and wax and wine,
> And the lovely colors called aniline;
> You can make anything from a salve to a star,
> If you only know how, from black coal tar."

But we left young Perkin staring at the beaker which had miraculously become transformed from a mass of dirty oil to a beautiful purple color. His next thought was to isolate the compound that gave the color,

to learn just what it was. Not an easy thing, that; it required days of hard work, but in the end he was successful. He made the first aniline dye. He called it Tyrian purple; later it was called mauve, and as mauve it is known today.

He made a small quantity of the dye and sent it down to the firm of Pullar at Perth for their trial. They were enthusiastic and wrote back, "If your discovery does not make the goods too expensive, it is decidedly the most valuable that has come out for a long time." They asked him for larger quantities of it.

He determined to give up teaching, to make the dye, and did so, in spite of the protests of Hofmann, who did his best to dissuade him from this mad venture. And indeed, from the view-point of common sense the older man was right. It did sound mad. Fortunately for the new business, the older Perkin and an elder brother had confidence in the venture and backed it financially. Even so the difficulties to be surmounted were enormous. The young boy was about to manufacture a substance which had never been made before. For it he would need apparatus of a kind as yet entirely unknown, undreamed. Every step in the process of manufacture had to be carefully plotted as a path in the wilderness. There were no guiding marks for him to follow. In the realm of industrial chemistry he was a pioneer.

YET in June of 1857, little more than a year after that epochal spring night, his equipment was designed and installed. He it was who had done it all. The next problem was the matter of raw material. He needed large supplies of benzene and nitric acid, from which he could make the nitrobenzene which was the basis for the dye. Nitrobenzene was not available itself. Indeed all this coal-tar residue at that time was considered waste stuff, to be disposed of as such. None of the manufacturing concerns bothered to save it. Perkin and his brother scoured the country for benzene in sufficient quantity for their use. Eventually they found some, in Glasgow, but they had to pay the excessive price of $1.25 a gallon for benzene so poor they had to redistill it before it could be used. Still, one difficulty had been overcome.

There remained the problem of obtaining nitric acid. And here the obstacle was even greater. It was simply impossible to obtain nitric acid that was strong enough for their purposes. In the end they were forced to manufacture it themselves from Chile saltpeter and sulfuric acid.

At last their difficulties were all solved, and they commenced manufacture of the dye. Alas, when it was tried out by commercial firms, it

was found that the goods dyed with this new substance, especially the cotton goods, came from dye-baths streaked. The firm of Perkin & Sons was depressed. They found the trade sceptical of their product, and it looked as though the venture was a failure. Young William, however, was nothing daunted. He set to work with a will on the problem of making the dyeing even, and he succeeded. For the cotton goods he used a mixer of tannic acid, and for the silk he suggested a soap bath. Both processes are still used today.

After that the sailing was smoother. Perkin soon became an authority on coal-tar colors. He was only twenty-three when he lectured before the famous Chemical Society of London. In the audience was the great Michael Faraday, whose lectures Perkin, as a student, had attended with such enthusiasm.

IT IS impossible to sum up accurately what this discovery of the first coal-tar dye meant to the world. It opened up a whole new realm of endeavor. Just in the matter of dyes alone, the future was enormously benefited. For instance, had there been no coal-tar dyes, Dr. Koch would not have discovered the organisms which cause tuberculosis and cholera, for it was with methylene blue, a coal-tar product, that his studies were carried out. Every hospital laboratory is well stocked today with a variety of coal-tar dyes.

The most important discovery in this field was made by two German chemists, Graebe and Liebermann, in 1868. They made from anthracene, another of the crude products of coal tar, alizarin, the famous "turkey red." The laboratory method of preparation was too expensive, and Perkin worked out a cheaper one which he patented, unfortunately one day too late. The Germans had beat him by a narrow margin. Immediately the price of anthracene, which had previously been thrown away or sold for a few cents a pound, went to $500 a ton. Immediately, too, the madder root industry, which previously had supplied all the dye, became obsolete. Great tracts of land along the Mediterranean, especially near Avignon, France, had to be turned to something else. From 1870 to 1877, 750 tons of alizarin were extracted from the madder root. By 1884 nearly twice as much was made artificially. The madder root industry had ceased to exist.

The next great discovery in dye chemistry was the synthesis of indigo in 1879 by a German, Adolph von Baeyer. Indigo was a much-esteemed dye, older than the Pharaohs. It was made from the indigo plant, and the indigo industry was an important one in Asia, especially in the East Indies and India. Indigo (the name means Indian) was not im-

mediately put on the markets in quantities. Nothing can better illustrate the difference between the methods of quantity production and laboratory production than the difficulties which had to be surmounted in this particular case. It took Perkin, working practically alone, a matter of a few months to produce mauve in quantity. It took the entire force of one of the largest chemical plants in Germany, the Badisch Aniline and Soda Fabrik, employing hundreds of expert chemists and thousands of mechanics, nearly twenty years to work out satisfactorily the manufacture of indigo in quantity. The cost is estimated at $5,000,000.

Once they were successful, indigo was put on the market at a few cents a pound. Immediately the growing of the plant became unprofitable. The value of the annual crop of the indigo planters dropped from twenty millions to less than half a million.

A derivative of indigo is the famous Tyrian purple of the ancient world. It is not an especially beautiful color; many of the modern dyes far surpass it, but it was exceedingly expensive. The wearing of garments dyed with this color was a mark of rank and wealth, especially wealth. The dye comes from snails, and it is said that the dye obtained from twelve thousand snails would make less than one-sixteenth of an ounce. The dyeing of a royal robe would cost thousands of dollars. Today the coal-tar dye of the same shade is available to every one at small cost.

TODAY more than two thousand coal-tar dyes are known, of all shades and colors. It has been estimated than more than two million men and women in the United States alone produce each year goods valued at more than three billion dollars, all dependent on dyes.

Perkin also contributed to science discoveries in the realm of perfumes, though he was not the first one in this field. In 1872 Tiemann and Wallach made the first synthetic perfume, if one could call it a perfume. It was, rather, a flavoring. The active principle of the vanilla bean, the part of it which gives it its odor and taste, was made and called vanillin. Enough beans to yield a pound of the product would cost $300, while the artificial flavoring could be marketed for one-fourth as much. This research was stimulated by the coal-tar dye researches, and the housewife can thank Perkin if her flavoring is cheap.

Perkin himself made the next discovery in this field. He made a substance called coumarin, which has the odor of new-mown hay, and which sold in 1911 for $6 per kilo (2.2 pounds) as compared with four times as much in 1875. A host of other perfumes and flavorings were discovered and made by other workers: heliotrope, lilac, musk, oil of

wintergreen, pineapple—there has been no end to them. Of course you can still buy flavorings of the natural product, and perfumes, too, but nevertheless, the most delicately scented and flavored substances are made from sticky tar, or products derived from the tar.

In other fields, the discoveries of the dye industry were made the basis for experiments in the manufacture of drugs. Salicylic acid, a cousin of which is known to every one under the name of aspirin, was the first medical product made. Others followed in large numbers: drugs to relieve pain, to cause anesthesia, drugs to ease fever, to use as antiseptics. All these came out of that first beaker of dirty aniline oil.

Explosives, too, for toluene, the chemical from which many dyes are produced, is the basic substance required in T. N. T.

IN SPITE of the fact that the discovery of a method of making dyes from coal tar was made in Britain, the English remained rather indifferent to the new business. Without a struggle, indeed with an entirely impassive attitude, they allowed Germany to monopolize the industry. They were to pay expensively for their lack of interest. In 1914 Germany almost completely controlled the dye industry, and with it the manufacture of many other products which were indispensable to victory. It is a direct route from dyes to explosives, and from explosives to poison gas. Had the British shown more interest in Perkin's work the World War, had it ever started, might have ended much sooner.

But the British were indifferent, and because of their indifference, Perkin retired early from business. In 1874, still a young man, he gave up his factory and, content with a modest fortune, devoted himself to research. In later years honors were heaped upon him. In 1906 he was knighted, and the same year, the fiftieth anniversary of his discovery of mauve, he was honored by chemical societies of both continents. In New York he was presented with the first impression of the Perkin Medal, a medal since awarded each year to that American chemist who has rendered the greatest service in applied chemistry.

Sir William Perkin died the next year, but the work he started goes on and on. Our modern life would be far less full of color, have fewer pleasant perfumes, would, in short, be an entirely different world, had not Perkin happened to add alcohol to that dirty oil in his beaker.

Chemistry at Nebraska

By Fred W. Upson

The development of the chemistry department and some of the problems peculiar to the teaching of chemistry at a state university.

THE department of chemistry at the University of Nebraska claims no such ancient lineage as that described by Professor Foster for the department of chemistry at Princeton in a recent number of THE CHEMIST. Its record, however, is an honorable one. Chemistry has been taught at Nebraska almost since the founding of the University in 1869, but only since about 1885 has there been a separate department of chemistry. Previous to that time science was taught in two groups, physical sciences and natural sciences.

There have been four heads of the department of chemistry since 1885; all are living, and three are resident in Lincoln. Professor Henry Hudson Nicholson became professor of physical science at the University in 1882, and head of the department of chemistry in 1887. In 1882, the outward symbol of the University consisted of a single building, known as University Hall. The University catalog for that year stated that "instruction was given by recitations from the textbook, lectures, and laboratory practice," and added, naïvely, under the head of "apparatus" that "the University is supplied with a laboratory for the department of chemistry and with abundant apparatus for illustrating the principles of physics."

Professor Nicholson has described in the following terms the chemistry laboratory, which he found occupying one room on the first floor of University Hall:

"Its stationary equipment consisted of a plain pine table on the top

of which was a rack of bottles. In one corner of the room was a cupboard for supplies and in the upper part of the room, near the ceiling, was installed a barrel tank for the water service. There were numerous bottles, jugs, demijohns, and carboys—mostly empty and all unlabeled—scattered about the room, and various packets and bottles of chemicals, generally open and unmarked, stuffed in the cupboard. Of reference books, journals, or even texts, there were none."

The second building to be built on the campus of the University of Nebraska was the old chemistry hall. Largely through the personal efforts of Professor Nicholson, the legislature of 1885 granted an appropriation of $25,000 for building and equipping a chemical laboratory. The erection of the building began in April of that year, and the building was occupied in the following December. For a number of years it housed not only chemistry but botany, physics, and zoology.

In these times of high building costs, it seems almost incredible that any sort of building could be constructed and equipped for $25,000. The first chemistry hall, at the time of its construction, was something of a model, and, in fact, ranked as one of five or six outstanding chemical laboratories in 1887. That it was really quite an unusual building is evidenced by the fact that it is still in use, and is at the present time the home of the College of Pharmacy. This building was remodeled in 1905, and served the department of chemistry until 1918, when the present chemical laboratory was occupied.

Excellent Library Developed

Aside from his activities in procuring the appropriation and planning the first chemical laboratory, Professor Nicholson performed another very important service for the department of chemistry. The department, today, is proud of its library. That we have an unusually good chemical library, containing all the important journal sets from the beginning, is due to the early efforts of Professor Nicholson. From the very first he realized the importance of a library; and the present excellent departmental library is simply a development from the beginnings which Professor Nicholson made in 1885.

One other activity for which Professor Nicholson should be given credit is the establishment of the Nebraska section of the American Chemical Society. This occurred in 1895, so that the Nebraska section was among the very early ones to be chartered.

Professor Nicholson remained head of the department until 1905. He is now past eighty years of age, but is still a familiar figure on the

OLD CHEMISTRY BUILDING

streets of Lincoln. His erect figure and handsome head command the admiration of his friends.

Increase in Enrollment

Dr. Samuel Avery succeeded Professor Nicholson as head of the department, coming from the agricultural college. Doctor Avery was in charge of the work of the department for only four years, for in 1909 he became chancellor of the University, which position he held for nearly twenty years. Under Doctor Avery's guiding hand the department of chemistry prospered, both in a material and scientific way. There was a considerable increase in student enrollment, and a marked development in the facilities for advanced work.

Later, during Doctor Avery's service as chancellor, the University underwent its period of greatest development. During the years from 1912 to 1925, the student enrollment more than doubled, and a great increase in the University physical plant occurred. The new chemistry building was one of nine to be added during Doctor Avery's regime.

On his retirement from the chancellorship, Doctor Avery came back to the department of chemistry as research professor, and resumed his work in synthetic organic chemistry almost at the point where he

had left it in the fall of 1908. It was as if he simply had returned to the laboratory after a short vacation. Doctor Avery is now one of the most active research workers in the chemistry department, having published no less than nine research papers in the past four years. In addition, he is responsible for the instruction in organic combustion analysis, a field in which he is tremendously interested, and one in which he has contributed a number of new methods and apparatus.

Dr. Benton Dales was in charge of the department for a period of ten years, leaving the department in 1918 to enter industrial work with the Goodrich Rubber Company. He is now with the du Pont Company at Wilmington, Delaware. It was under Doctor Dales' regime that the new building was constructed, and he was largely responsible for working out the plans and details.

The writer of this sketch has been chairman of the department since 1918.

New Chemistry Building

The building now occupied by the chemistry department is of the modern type very similar to those which have been built in recent years at a number of western universities. While it contains no unusual features, it provides adequate quarters for work in the various divisions of chemistry. There are two large laboratories devoted to general chemistry, one devoted to qualitative analysis, and one to organic chemistry. In addition, there are well-equipped laboratories for special work in physical chemistry, analytical chemistry, and advanced organic chemistry, as well as the usual type of lecture and class rooms.

It may be of interest to tell briefly about the instructional work of the department. In a large state university, a chemistry department must serve several types of students. First, there are those who are preparing to follow chemistry as a profession. Secondly, students in engineering, agriculture and home economics, geology, pharmacy, and medicine are all required to take from one to three years of chemistry as an adjunct to the work in their own special fields. We therefore find at Nebraska a large number of students in the elementary courses. Some 600–700 students take freshman chemistry, in six divisions. During the year, about 150 students are found in the courses in qualitative analysis, and 250 in the courses in elementary organic chemistry.

The Course of Study for Chemists

A student who is taking a major in chemistry or who plans to continue in graduate work takes, during his sophomore year, qualitative

analysis and elementary organic chemistry; in the junior year he takes a semester of quantitative analysis and a semester of elementary physical chemistry; during his last year, he may elect one or more of several advanced courses. About thirty-five students take a year's work in advanced organic chemistry, and approximately an equal number take the second course in physical chemistry.

Graduate Work

Facilities for graduate work in chemistry at Nebraska are very good. At the present time, four members of the staff are directing graduate work in organic chemistry, four are directing in physical chemistry, one in analytical chemistry, one in industrial chemistry, and one in agricultural biochemistry.

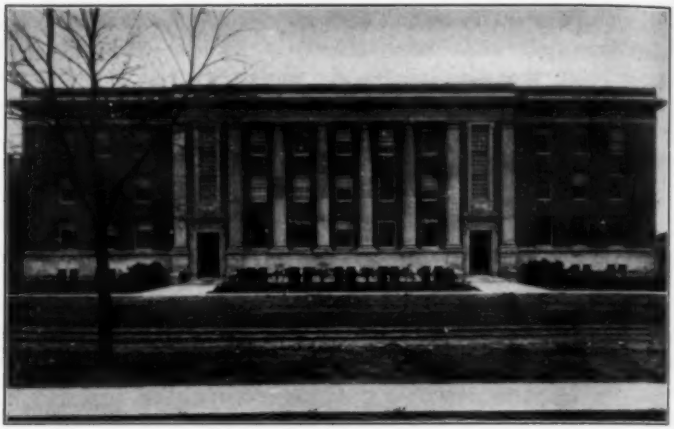
The more important fields of organic research which are represented are condensation reactions, organic compounds of arsenic and antimony, and the chemistry and structure of the carbohydrates. In physical chemistry, the various problems under investigation include surface tension and phase rule studies as well as studies of oxidation-reduction potentials, heats of reactions, and photographic color photometry.

In the industrial field, the work is mainly in petroleum chemistry, while in analytical chemistry, new methods of volumetric analysis are being studied. In biochemistry two fields are represented, animal nutrition and cereal chemistry. For the latter, a complete experimental milling and baking laboratory is maintained.

During the present year, thirty-five graduate students have been registered in the department. Thirteen of these are candidates for the Ph.D. degree, and the remainder for the master of science degree. Some twenty assistantships are available to students pursuing graduate work. In addition, a large eastern organization has maintained for several years from three to five fellowships for the study of organic arsenic compounds, and at least one university research fellowship is usually available in chemistry.

The graduate college of the University of Nebraska was chartered in 1885, and is said to be the first graduate college established in a state university.

It now registers some 500 students each semester, and about 700 students during the summer term. Almost every department of the University offers work toward the master's degree, and about half the departments are equipped to offer the doctor of philosophy degree.



NEW CHEMISTRY BUILDING

The entering student, either for the master's or doctor's degree, usually takes a survey examination, the results of which determine his preparation for graduate work. The candidates for the master's degree take both written and oral examinations. Theses are required.

Candidates for the doctor's degree take a comprehensive written examination covering the fields of their major and minor subjects toward the close of their second year of work, after which they are expected to devote at least a year to their research. The final oral examination comes after the thesis has been completed and accepted. Instruction in the graduate college is to a large extent of the seminar type, and a considerable degree of individual work is expected, particularly of the Ph.D. candidates.

BY-PRODUCTS

How to Write Book Reviews

THE art of book reviewing has fallen upon degenerate days. Only rarely do we discover a reviewer of originality, independence, and keenness, who can judge a work according to the highest classical standards. Much of what passes for literary criticism is merely inept adulation or sales promotion. To assist in remedying this deplorable condition we have drawn up a set of rules for the guidance of those who would review books. These rules are the result of long experience and are of the highest authority. They should never be departed from except in the gravest emergencies.

First, don't read the book. If you do you may discover something to praise or something that may influence your judgment.

Remember that the author is a reprehensible scoundrel who has committed an unforgivable crime in daring to publish a book.

You are perfectly secure in being as offensive as you like. The author cannot retaliate.

Do not make the mistake of thinking that book reviews are intended to convey any information concerning the publication being dissected. The reading public regards them simply as *jeux d'esprit*, to exhibit the cleverness of the writer.

Praise nothing, not even the author's use of good English. To do so will be considered evidence of feeble-mindedness.

Ferret out every misprint and expose it in scathing terms. The author will be eternally obliged for the corrections.

If the author is humorous, condemn his frivolity; if he is serious, denounce his conceited dogmatism.

Garble the text. Pick statements out of their matrices and combine them to make ridiculous nonsense. The more expert you are at reviewing, the more skillful you will be at this entertaining diversion.

If you cannot discover an obviously erroneous assertion refer to some statement in such a way as to imply absurdity. For instance, if the author says the sun rises in the East, remark that the "writer appears to have peculiar notions about the motion of celestial bodies." This always is highly appreciated.

If you cannot expose specific faults, talk in general terms. Your

reader will admire your profundity and doesn't want to know anything about the book anyway.

Dip your pen in 30% fuming sulphuric acid. Ordinary vitriol is much too weak for your purposes.

Never lose sight of the fact that, in demolishing the hopes and aspirations of the author, you are performing a public service. If no one should discourage book-making, consider what a flood of worthless literature would inundate the land!

Always assume an oracular authority, as if the concentrated wisdom of the ages were concentrated in your intellect. Deliver your denunciations with a ponderous and dignified gravity. The reader grovels before dogmatic sarcasm. And the author hasn't any friends, anyhow.

However—a word of caution. If the author is a successful and famous personage, whether he writes classics or drivel, throw all these rules away and prostrating yourself before him, lick his boots. Praise his inanities, enthuse over his platitudes, quote his banalities as the insight of genius. You will not deceive the reading public, which never fails to appraise you at your proper value.

They Say

"AGAIN, the truths of reason and of physical science are quite independent of our volition; but this fact does not provide for our knowledge of them. They do not get themselves known, but we come to know them only through slow, painful, and persistent research. Science itself is one of the great achievements of human freedom. We do not drift into it, neither is it let down ready-made from the skies; but by the patient toil and devotion of free men the temple of science and knowledge is built up."—B. P. BOWNE

"The business of the scientist is to order certain classes of appearances in terms of the most convenient fiction for his particular field of study, and a scientist need be none the worse a scientist for believing wholeheartedly in his fictions—perhaps rather, on the contrary. But when the scientist proceeds to metaphysics—for it is nothing less to proceed to the study of becoming—what were convenient fictions become inconvenient.

"The difficulty of modern relativity-physics, we understand, is to persuade events to undergo the formality of taking place."—J. C. MCKERROW

—*The Autocratic Chemist*

BOOK REVIEW

Introduction to the History of Science. By GEORGE SARTON. Volume II, in two continuous parts with single index. Published for the Carnegie Institution of Washington by *Williams and Wilkins*, Baltimore. $12.00, not sold separately.

Thoughtful students of general history often wonder at the gap in human knowledge between the fall of Rome and the official revival of learning. Where was science for all that time? The hazy and biased presentation still given in many history textbooks must be due to an inherited reluctance on the part of good Christian teachers and writers to admit that for nearly four centuries human knowledge was nurtured by the Jews and Muslims.

The first volume of this epochal work (published, 1927) covering the two thousand years from Homer to Omar Khayyam, shows that the intellectual supremacy of the Arabic civilization was firmly established by the end of the eleventh century.

The present volume shows that the next two hundred years marked an important period of transition and compromise, tending to some degree of fusion among the three conflicting cultures. This was very evident in the language requirements. In 1200, any aspiring scholar had to know Arabic; but with the wider diffusion of Muslim knowledge among Jewish and Christian civilizations, its superiority steadily waned until, by 1400, the intellectual supremacy was established in Western Christendom and the scholar had to know Latin, Hebrew, and Greek. The thirteenth century presented three distinct civilizations: the Greco-Latin-Arabic, the Hindu, and the Sino-Japanese. The few trickles of exchange had no weighty influence on the trend and intellectual legacy of Latin-Arabic thought.

This book is the first serious attempt to make a complete inventory of medieval science, but it should not be considered merely as a dictionary or bibliography. Following a long introductory chapter that sketches in the whole background of the two centuries and outlines the topical subjects, Volume II is divided into four books, covering fifty-year periods. Each of these starts with a "synthetic chapter" in which the reader is urged to seek out his subject and visualize its background before reading the details in the "analytical chapters" that follow. The

latter present first the religious and philosophical background of the given half-century, and then cover the current state of all branches of science: astronomy, mathematics, physics, technology, music, chemistry, geography, natural history, medicine, historiography, law, sociology, and education. Because of the great importance of the means of transmitting knowledge, and the growth of European vernaculars, special sections are devoted to the work of the best translators, and to philology.

Such a horizontal method of presenting a survey of all known countries contemporaneously is shorter and more logical than the vertical method of following each country from its beginnings to date, with little or no consideration of its international relationships; and as more history accumulates behind us, it is to be hoped that this method will be used more and more. It makes this work seem more like the intellectual map of the middle ages that Dr. Sarton considers it, shows science in the broadest sense, and makes us appreciate why the scholars of those days were learned in most, if not actually all, of the branches listed.

Each division is named for the three outstanding men of the period, and interwoven with the more familiar names—William of Conches, Ibn Ezra, Ibn Zuhr, Ibn Rushd, Maimonides, Abelard, Gerard of Cremona, Frederick of Hohenstauffen, Albert the Great, St. Thomas Aquinas, Ramon Lull, Saxo Grammaticus, Robert of Lincoln, and Roger Bacon—are many worthy compatriots of each, as well as Hindus, Greeks, Chinese, Japanese, a few Germans, and several notable Icelanders.

Following the narrative of each man's life and work is a complete bibliography of original texts, critical studies, and every other available reference, making the book a veritable treasury of information. Many popular myths are exploded for lack of sound proof; several doubtful dates of inventions and discoveries are better fixed; and apocryphal writings are carefully segregated from authentic lists. As this fascinating story rolls by, against the background of the rising universities—Salerno, Bologna, Paris, Montpellier, Oxford, Cambridge, Salamanca, and others—it all seems like a gigantic panorama, enlivened by the author's informal style and simple expression into a semblance of a talking moving picture.

This is indeed a wonderful book, but because I would have it also a perfect book, I deplore its occasional carelessness, colloquialisms, and grammatical errors. In the writing of any book that threatens to fill 1250 large pages one should certainly resist all temptations to be chatty. The repetition in all those introductory chapters and summaries are well meant but they aroused frivolous memories of the "Plan for a Good

Sermon: (1) Tell them what you are going to tell them; (2) Tell them; (3) Tell them what you told them." Also, the reading of page after page of large and often solid blocks of the same type, with no differentiation between text and book titles or quotations is a little hard both on the eyes and on the brain.

But these are mere freckles on the face of a literary leviathan! No other work of this magnitude has ever been conceived. It should stand as the supreme source book for all future work in the history of science, and, as such, it should be available in every library. Volume III, on the fourteenth century, and Volume IV, on the fifteenth, will soon be ready for publication, and it is devoutly to be hoped that their distinguished author will be spared for the many years that may be required to bring the study down to our own times.

FLORENCE E. WALL

Hydrogen Ions. By HUBERT T. S. BRITTON. *D. Van Nostrand.* 2nd Ed. $9.00.

In introducing this second edition of *Hydrogen Ions* within three years, both Professor Britton and the publishers emphasize the rapid progress of modern research, which makes a monograph of this encyclopedic character tend to become obsolete with great speed.

In most respects the book is genuinely encyclopedic. There is a lengthy discussion of the theoretical background, including a chapter on the Debye-Hückel-Lewis theory of electrolytes, a chapter on each of the various types of electrolytic method of hydrogen-ion concentration, two chapters on colorimetric methods including a discussion of buffer solutions.

There follow in order a number of chapters on various precipitation reactions, especially those of analytical chemistry, and on the industrial importance of hydrogen-ion concentration in many large applications. There is a short chapter of notes on the preparation of some indicators, which might well have been omitted. On the other hand, up to date as the book is, it is marred by the omission of all reference to the considerable progress in continuous pH determination apparatus and other pH apparatus made by American manufacturers. A more important omission is that of a bibliography. Although citations are numerous, they are scattered.

All in all, the tremendous scope of the book should make it a valuable addition to the library of any practicing chemist, no matter what his special field.

KARL M. HERSTEIN

OUR AUTHORS

A Chemical Leader

Frederick E. Breithut, toastmaster for the medal award dinner, has often before presided ably at gatherings of chemists. He retires this year as president of The American Institute of Chemists, an office to which he devoted four constructive years, described more fully in the biographical sketch, "The Builder of a Profession," in last month's issue of THE CHEMIST.

Closely associated with Dr. Herty both during the war and afterwards, Dr. Breithut was a particularly happy choice as the man to furnish the conversational setting for the evening's speeches.

Social Side of the Medalist

Henry W. Jessup (Princeton, '86) is a lawyer who is probably the leading New York authority on surrogate's practice. He frequently appears before the Court of Appeals in behalf of other lawyers.

Mr. Jessup is the author of several law textbooks and a book on legal ethics. Of wide intellectual interests, he has also written a book on ecclesiastical history, and several books of semi-legal fiction, a field in which his sense of humor is particularly useful.

Expert on Chemical Achievement

Marston Taylor Bogert, F.A.I.C., like Dr. Herty, is a former president of the American Chemical Society, an office he held for two years. His work and that of Dr. Herty are especially closely related, since it was during Dr. Bogert's term of office that there was established on a firm foundation the *Journal of Industrial and Engineering Chemistry*, the publication of which Dr. Herty was later to become the constructive editor.

The recipient of many international honors, including the presidency of the Society of Chemical Industry, Dr. Bogert has not allowed his honors to interfere with the efficient administration of his courses and his research in organic chemistry at Columbia. He is the country's leading authority on the enormously complicated subject of perfumes.

Dr. Bogert spends his summers in Maine on his thousand-acre estate at Belgrade Lakes, where he thoroughly enjoys the fishing.

Noted Editor

John H. Finley has had a distinguished record as educator, author, and editor. In an unusually full and varied career he has been, among other things, a college professor, president of three colleges, editor of *Harper's Weekly*, lecturer at Harvard, and is at the present time associate editor of *The New York Times*.

Holder of honorary degrees from eighteen colleges, Dr. Finley is a member of the national senate of Phi Beta Kappa and is an honorary life member of the Metropolitan Museum of Art. He is president of the American Geographic Society.

Dr. Finley is an officer of the Legion of Honor, Knight of the Holy Sepulchre, and holder of a number of other foreign decorations, including the Order of the Rising Sun (Japan). He is on the boards of many philanthropic institutions and societies and is a member of the following clubs: Century, Players', Grolier.

Worker for Public Health

Joseph E. Ransdell, for thirty-two years a member of Congress, including eighteen years as senator from Louisiana, has long been a student of the government's relation to health. He has carried out his ideas in action as the author of three bills on health problems. He is also deeply interested in the development of the nation's rivers and harbors for navigation and in controlling the Mississippi floods, which frequently devastate his native state of Louisiana.

Active, vigorous, and healthy, Senator Ransdell cares nothing for sports, gets most of his pleasure from work. A hobby is farming, especially developing pecan groves. He also aids farmers to secure homes on tracts of 40 to 80 acres by selling them land on easy terms and by otherwise helping them.

Builder of American Chemistry

Francis P. Garvan is president of The Chemical Foundation, also is president of the United States Institute for Textile Research. He became interested in chemistry when his work as Alien Property Custodian showed him the thorough grip which German industrialists had gotten upon the business life of America.

His creation of The Chemical Foundation was characterized by Senator Wadsworth of New York as "the greatest piece of constructive thought of the war period"; and it earned for him the title of the "father of the American dye industry."

Having carried out his original purpose of making America chemically independent, particularly as regards medicinal chemicals, Mr. Garvan turned to assisting colleges and scientific organizations. Broad-minded in his philanthropies, he has helped not only his own college (Yale) but also Harvard, Johns Hopkins, Cornell, Princeton, and many others.

He was the recipient, with Mrs. Garvan, of the Institute Medal in 1929.

Mr. Garvan lives at Roslyn, L. I., and is frequently seen at hunt race meetings, especially if some of Mrs. Garvan's steeplechasers are running.

Chemistry and Fruit

Hartley Rowe, a Purdue graduate, is vice-president in charge of engineering and research of the United Fruit Company. This, however, was not his first business experience in the tropics. He was resident engineer at the Panama Canal during practically the entire construction period.

Mr. Rowe is responsible for the development of the research department of the United Fruit Company.

Of an athletic build, Mr. Rowe is known in his company for his keen, alert mind and for his determination and self-control. He is fond of golf.

Patent Expert

Joseph Rossman, Ph.D., American University, received his degree in chemical engineering from the University of Pennsylvania, then went to the patent office as an examiner. Taking his law degree at George Washington University, he became a patent attorney and a member of the bar of the United States Supreme Court. He is editor of the *Journal of the Patent Office Society*, and has written two books: *The Psychology of the Inventor* and *The Law of Patents for Chemists* of which the latter is scheduled for review in an early number of THE CHEMIST.

Of medium height, slender, Dr. Rossman likes to write. Other hobbies are music and psychology. Normally even-tempered, he is sometimes annoyed by the human stupidity with which patent examiners are daily confronted.

Beginning of Coal-tar Chemistry

E. Lucie Weart majored in chemistry at Oberlin and has spent most of the time since graduation in medical work, a field in which her activities have been either editorial or connected with advertising.

Recently Miss Weart came to New York to take a position with the Tubize Chatillon Corporation, for whom she abstracts current technical journals dealing with rayon and also takes care of publishing a weekly bulletin. Her previous articles on scientific subjects have been published in the *American Mercury* and the *North American Review*.

Miss Weart's hobbies are horseback riding and chess.

Chemistry at Nebraska

Fred W. Upson, Ph.D. (Chicago), has been associated with various colleges in the middle west since 1910, when he became instructor of chemistry at the University of Cincinnati. After a year as instructor at the University of Chicago, he went to Nebraska, where he has been professor of chemistry since 1913, chairman of the department since 1918, and dean of the graduate college since 1929.

Dr. Upson's field of research is carbohydrate chemistry. His hobbies are gardening and fishing.

INSTITUTE NOTES

National Council

The ninety-first meeting of the Council of The American Institute of Chemists was held at The Chemists' Club, 52 East 41st Street, New York, N. Y., on Saturday, May 7, 1932. President Frederick E. Breithut presided.

The following councilors and officers were present: Messrs. Arnstein, Cayo, Crossley, Harold, Herstein, Knight, Lynch, Neiman, Sachs, and Zons. Mr. Edward L. Gordy, editor of THE CHEMIST, and Mr. Frederick Kenney, chairman of the New York Chapter, were also present.

The treasurer's report was read and accepted.

Mr. Sachs of the Auditing Committee suggested that each expenditure should be accompanied by a receipted bill or notation, and stated that he would confer with the next treasurer relative to the matter.

The auditing Committee reported that the treasurer's report has been audited and found correct, and the report was accepted.

Dr. Knight of the Ethics Committee suggested that the waiver on application blanks and notice on bill receipts as to acceptance of the code of ethics as essential to membership, be referred to the Legal Committee.

Mr. Cayo reported on the unemployment situation in Philadelphia; and upon motion made and seconded it was

Resolved, That the Institute appropriate not to exceed $100 to the Pennsylvania Chapter for the relief of unemployment.

The Pennsylvania Chapter was authorized to appoint a representative to the Philadelphia Technical Service Committee for Unemployment in the Philadelphia District; and the Pennsylvania

Chapter was instructed to have the name of The American Institute of Chemists placed on the letter-head of the Technical Service Committee.

HOWARD S. NEIMAN, *Secretary*

Washington Chapter

On Tuesday evening, May 24th, the Washington Chapter gave a dinner at the Cosmos Club in honor of Dr. H. G. Knight, newly elected National President of the Institute. The dinner was attended by approximately forty people.

The chairman of the Washington Chapter, Mr. D. F. J. Lynch, of the Color and Farm Waste Division, introduced the speakers of the evening, Dr. E. V. McCollum of Johns Hopkins University and Dr. H. G. Byers of the Bureau of Chemistry and Soils. Dr. Byers, a lifelong friend, gave incidents, humorous and otherwise, from the life of the new Institute president. Dr. Knight replied with a short speech of appreciation.

The members and guests of the Chapter signed a parchment scroll of felicitations to Dr. C. E. Munroe, Honorary Fellow of the Institute, on the occasion of his 83rd birthday.

A short business meeting followed the dinner. The following officers were elected for the coming year:

Chairman, A. L. Mehring; Secretary, C. E. Senseman; Treasurer, John White McBurney; Vice-Chairman, S. M. Weisberg.

J. D. REID, *Reporter*

New Member

The following member was elected at the meeting of the National Council held on May 7, 1932:

FELLOW

WILLIAM W. WINSHIP, Manager, The Thermal Syndicate, 58 Schenectady Avenue, Brooklyn, N. Y.

Applications for Membership

The following new applications for membership have been received:

FELLOWS

HARRY BENNETT, Chief Chemist, Glyco Products Co., Inc., 33—35th Street, Brooklyn, N. Y.

CHARLES WALLACE MACFARLANE, Consulting Chemist, Oaks, Pennsylvania.

JUNIOR

LEO HORWITZ, Production Manager, Felton Chemical Co., Inc., 599 Johnson Avenue, Brooklyn, N. Y.

NEWS

James F. Couch, F.A.I.C., of the Bureau of Animal Industry, has been elected a member of the Washington Academy of Sciences in recognition of his work on the active principles of stock-poisoning plants.

An article by Dr. Couch describing this branch of the government service is contained in the January CHEMIST.

Milton C. Whittaker, F.A.I.C., has been elected a director and vice-president of the American Cyanamid Company.

Charles H. LaWall, F.A.I.C., has completed the first assignment of his work on opium assay methods as a member of the International Committee of the Health Council of the League of Nations.

Crime Detection

The Philadelphia College of Pharmacy and Science will offer a one-year graduate course in scientific methods of crime detection, leading to the degree of master of science in chemistry. The course will include classes in finger-print analysis; the study of weapons and ammunition; analysis and identification of foods, drugs, fibers, textiles, and miscellaneous materials; the study of maps, plans, and drawings; toxicology; micro-chemistry, micro-photography, and crystallography.

The college museum, open to police officials all over the world, will contain samples of every brand of cigarette in the world, tire tread patterns, every grade of paper and twine, and analyses of different types of soil.

Discusses Tariff

Commissioner of Customs **F. X. A. Eble** was the guest of honor at a meeting of the Drug and Chemical Section of the New York Board of Trade held at the Hotel Pennsylvania on May 12th.

After the dinner Commissioner Eble spoke on the American tariff and its administration. He dealt particularly with conditions surrounding the importation of foreign goods through the port of New York.

The Mendel Medal

Francis P. Garvan, formerly Assistant United States Attorney General, head of The Chemical Foundation and newly elected president of the U. S. Textile Institute, has been awarded the 1932 Mendel Medal, given by Villanova College in recognition of contributions to scientific progress.

The award was presented at the Commencement exercises on June 7th.

Former winners of the Mendel Medal are: Dr. John A. Kolmer, professor at the University of Pennsylvania; Dr. Albert F. Zahm of the Congressional Library; and Dr. Carl F. Kerzfeld of Johns Hopkins.

German Dyes

In 1931 German exports of coal-tar dyes showed an increase over the exportation figures for 1930. Chief consumers of these German exports were China, India, Czecho-Slovakia, Great Britain, Holland, Belgium.

Gibbs Medal

The Willard Gibbs Medal of the Chicago Section of the American Chemical Society has been awarded to Edward Curtis Franklin, professor emeritus of organic chemistry at Leland Stanford, for his work on liquid ammonia solutions, by which, according to the citation, Dr. Franklin "opened up an entirely new field and also modified profoundly our views on aqueous solution."

The award is made annually to a scientist whose "work in either pure or applied chemistry has received world-wide recognition."

One of the best known of American chemists, Dr. Franklin has been extolled as a pioneer whose achievements promise future triumphs for chemistry. His work has been described as "a striking example of the application of the scientific method to the development of knowledge and a contribution of the first importance to the chemistry of nitrogen."

Dr. Franklin is a past president of the American Chemical Society. He received the William H. Nichols medal for 1925, and he is an Honorary Member of The American Institute of Chemists.

The Swann Corporation announces that as part of its expansion program it has opened district offices at Baltimore, Md., and at Charlotte, N. C.

The United States Gypsum Company has declared the regular quarterly dividend of 40¢ on the common stock and $1.75 on preferred.

Martin Kilpatrick, Jr., F.A.I.C., and **Mary L. Kilpatrick** are the authors of an article, "The Teaching of the Theory of Dissociation of Electric Lights. II. The Definition of pH," in the *Journal of Chemical Education* for June.

Arthur K. Doolittle, formerly head of the lacquer division of Sherwin-Williams, is now doing development work on surface coatings with the Carbide and Carbon Chemical Corporation.

John B. Holtzclaw, formerly chief chemist of the Kentucky Highway Department, is engaged in chemical research with the Standard Oil Development Company.

A. Richard Bliss, Jr., F.A.I.C., received the degree of Doctor of Laws from Howard College at the annual commencement. Dr. Bliss is chief of the division of pharmacology at the University of Tennessee, and has long been known for his researches and writings on drugs and other medicinal chemicals. He is the author of three books and many papers, dealing particularly with chemistry as applied to medicine.

Dr. Bliss is a contributing editor of THE CHEMIST.

Publications

Recent publications of the members of The American Institute of Chemists include an article on "Capital Costs vs. Labor Costs in the Chemical Industry," by **C. R. Downs,** and a joint publication of **Charles E. Mullin** with **Howard L. Hunter** on "The Cellulose Ethers."

Both of these papers appeared in the April issue of *Chemical Markets.*

Wilford W. Scott, head of the chemistry department of the University of Southern California, died suddenly at the wheel of his automobile on May 2nd. Professor Scott was 56 years old. He had been a member of the American Chemical Society for 9 years.

Mellon Institute Report

According to the report of the director, Dr. E. R. Weidlein, the sum of $722,541 was received by the institution from industrial fellowship donors during the fiscal year ended February 29, 1932. Throughout the year covered by the report 75 industrial fellowships, employing 176 scientists and engineers, were in operation. At the close of the year 58 fellowships were active; and of these 28

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have been at work for 5 years or longer and 13 have concluded more than 10 years of research.

In reviewing the progress that has been made since 1911, when the industrial fellowship system was established at the University of Pittsburgh, Dr. Weidlein points out that Mellon Institute has had fellowships on 230 distinct subjects, on which 775 scientists and engineers have been engaged. During the period 1911–32, 313 fellows and 357 fellowship assistants of the Institute have completed their services to science and technology in the institution and have entered the fields of industry and education. As trained additions to the forces of manufacturing and teaching, these men, Dr. Weidlein says, constitute the Institute's greatest contribution to humanity.

The fellowship achievements of 1931–32 are summarized in the report, special attention being given to the research advances made by the Air Pollution Investigation, the Multiple Fellowship on By-Product Coke, the Iodine Investigation, the Organic Synthesis Fellowship, the Petroleum Production Fellowship, the Protected Metals Fellowship, the Steel Fellowship, the Sugar Investigation, and the Fur Fellowship. The activities of the Institute's Department of Research in Pure Chemistry are also described.

During the calendar year 1931 members of the Institute made the following additions to the literature: 2 books, 4 bulletins, 39 research reports, and 33 other papers. Twenty-two U. S. patents and 33 foreign patents were issued to fellows. Lists of the Institute's publications, 1911–32, and copies of Dr. Weidlein's report for 1931–32 will be sent gratis to laboratory directors, librarians, and science teachers upon request.

The constructional work on the Institute's new building is said to be proceeding satisfactorily; it is thought that this edifice will be completed and ready for occupancy in the summer of 1933.

The National Research Council has issued a supplement to the *Bibliography of Bibliographies on Chemistry and Chemical Technology*, compiled by **Clarence J. West** and **D. D. Berolzheimer.**

This book, designated as Bulletin 86, may be obtained at a cost of $1.50 from the National Research Council, 2102 Constitution Avenue, Washington, D. C.

According to Walter Roth, editor-in-chief of the *Chemiker-Zeitung*, the number of qualified chemists unemployed in Germany at the present time is 15%.